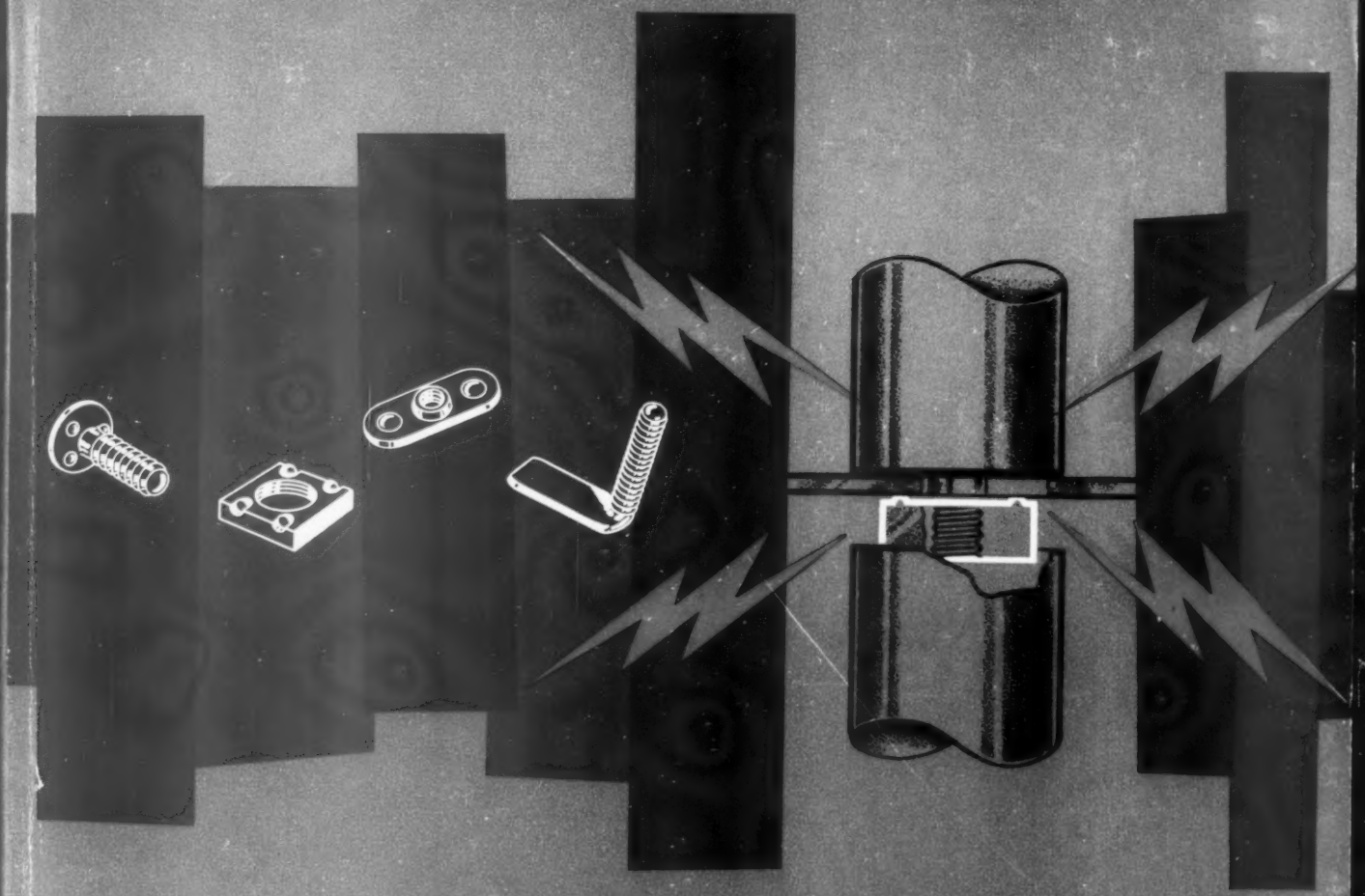
A HITCHCOCK PUBLICATION

assembly & fastener ENGINEERING



JULY • 1959

In this issue: **Resistance Welded Fasteners—Part 1**
Kimball Tradition Applied in Electric Organ Assembly
How Good Are the Self-Tapping Screws You Buy?

Question . . . quote . . . quality!

This man is solving a fastener problem

the Pheoll *way!*

The *dependability* upon which we set our sights at Pheoll is always intersected dead-center by the hairlines of precision and uniformity. Quality control is a requisite—not just a name on a door. Pheoll fastener specialization means untiring devotion to precision engineering . . . economical mass production with the newest automated assembly equipment . . . and the most valuable intangible asset in the world, the willingness to TRY for better solutions of your problems, for ways to cut your production costs. Question us for fastener facts . . . note our *quote* . . . then stand by for *quality*—guaranteed by Pheoll!

The MAN in the photograph, incidentally, is responsible for quality control from stock to finish . . . Wally Robinson, Manager of Quality Control . . . master of micrometers, gauges and scales . . . *your* man for quality.

Pheoll Manufacturing Company

Industrial Fastener Division

5700 WEST ROOSEVELT ROAD

CHICAGO 50, ILLINOIS

Use Postpaid Card. Circle No. 201

assembly & fastener ENGINEERING

July, 1959 Volume 1, Number 10

EDITORIAL STAFF

William F. Schleicher
VP and editorial director

Matt E. Heuertz
Managing editor

Darrell Ward
Engineering editor

Ray H. Smith
Associate editor

William D. Engstrand
West coast editor

P. L. Gibbons
Reader's service

Vic Erickson
Editorial art director

BUSINESS STAFF

Robert C. Van Kampen
President

Vincent C. Hogren
Executive vice president

J. E. Hitchcock
Vice president

Oliver S. Pepper
Business manager

John S. Todd
Production manager

D. L. Campbell
Adv. production manager

Gene West
Fulfillment manager

Robert L. Spreckels
Circulation manager

Raymond J. Sietsema
Director of research

Bruce B. Howat
Marketing director

L. M. Schroeder
Adv. art director

FEATURES

Let's Balance Our Budget! 7
Issues connected with the 1959-60 federal budget are discussed by the Committee for Economic Development.

How Good Are the Self-Tapping Screws You Buy? 22
Here is a check list for incoming inspection of screws, including examples of simple test gages.

Design and Application of Weld Fasteners—Part 1 28
First of two articles covers types of weld projections available with these fasteners. Welding techniques will be covered in August.

Tradition Applied to Assembly of Electric Organs 37
Kimball found key to efficient assembly was in standardized procedures for building up wire harnesses.

Dirt-Proof Joints for Food Handling Carts 43
Welding, brazing, riveting, and swaging play important roles at McClintock.

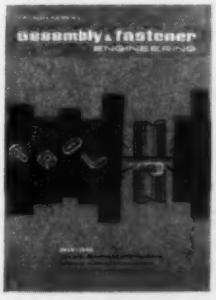
Blind Rivets Permit One-Man Assembly 49
How pull-through and self-plugging rivets permit fastening operations from one side of work.

DEPARTMENTS

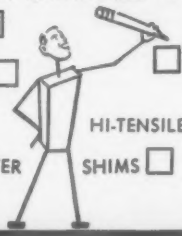
2 **Letters to the Editor**
5 **The Editor's View**
8 **Business Notes**
11 **Industry at Work**
15 **Assembly & Fastening Ideas**
19 **Reports from the Field**
53 **What's New in Equipment**
57 **What's New in Fasteners**
61 **Useful Literature**
65 **Industry Makes News**
69 **Product Index**
69 **Quarterly Article Index**
72 **One Last Word**

Subscription rates: $6.00 per year in U.S.A. $7.50 per year elsewhere. Copyright 1959, by Hitchcock Publishing Co., Wheaton, Ill. Phone MO 5-1000. Cable address: HITCHPUB. Accepted as controlled circulation publication at Pontiac, Illinois.

• From their beginning some 30 years ago, weld fasteners have reached a 500-million parts-a-year business. For a report on how and why they are used, turn to page 28.



SPECIAL WASHERS ☐ U.S. STANDARD WASHERS ☐ FENDER WASHERS ☐
RIVETING (BURR) WASHERS ☐ LIGHT STEEL WASHERS ☐ FLAT WASHERS FOR
PRE-ASSEMBLY (SEMS) ☐ S.A.E. WASHERS ☐ MACHINE SCREW WASHERS ☐
ALUMINUM, BRASS AND COPPER WASHERS ☐ BELLEVILLE TYPE WASHERS ☐
MALLEABLE BEVEL WASHERS ☐ MINE ROOF WASHERS ☐
MALLEABLE ROUND WASHERS ☐ EXPANSION PLUGS ☐
SPRING LOCK WASHERS ☐ HI-TENSILE STRUCTURAL WASHERS ☐
SQUARE WASHERS ☐ CASTER SHIMS ☐ AN 960 FLAT WASHERS ☐
MACHINERY BUSHINGS ☐



check your washer needs,

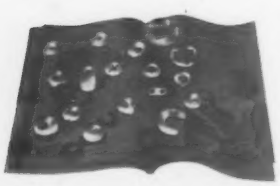
JOLIET*

can supply them all!

*QUALITY WASHERS SINCE 1914

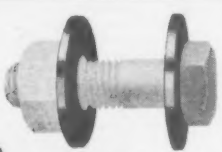
Joliet Wrought Washer Company offers the reserve capacity and flexibility needed to meet both your regular and emergency requirements for washers of all types — standard and special. Capacities range from ¼" to 8" O.D. with thicknesses from .008" to ½". In all metals, all finishes, including heat-treating.

SPECIAL WASHERS

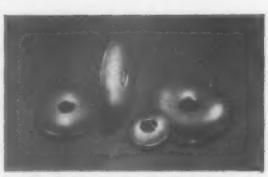


We maintain our own tool and die shop assuring you the utmost in prompt service on new tooling. Your orders are never too large for adequate service, nor too small for personal attention.

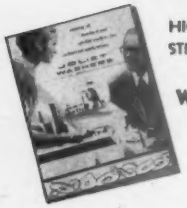
Available in steel, stainless, copper, brass, lead, aluminum, bronze. In these finishes: Hardened washers ASTM Specifications, case hardening, carbo-nitriding, dry cyanide cadmium, chromium, copper, zinc di-chromate, phosphate finishes, Parkerizing, hot zinc galvanizing, shot peening, roto-blasting, tempering and electro-plating.



HIGH-TENSILE STRUCTURAL WASHERS



BELLEVILLE TYPE WASHERS



Write for free 16 page catalog

JOLIET WROUGHT WASHER COMPANY
310 Connell Avenue — Joliet, Illinois

Use postpaid card. Circle No. 204

Letters to the Editor

Torque, Tension, Tightening

We are subscribers to your publication which is widely read and digested in our organization.

We are particularly pleased to see that the subject of torque-tension relationship and the general subject of tightening threaded fasteners has received so much publicity. It will assist us in teaching the proper application of threaded fasteners.

I would like to impose upon you for three extra copies of the articles on torque and tightening threaded fasteners that appeared in your February, March and May issues.

N. P. Maycock
Senior Service Metallurgist
Heavy Bolt Division
Steel Company of Canada, Ltd.
Toronto, Ontario

Junior Achievement, Hobby-neering

Our company has sponsored a Junior Achievement Company for the past few years, and as advisors to this company we feel that your "Hobby-neering" pull-outs would be of interest in planning future subjects. We would like very much to receive all previously published copies of this pull-out.

William A. Lloyd
Chief Tool Engineer
Hayes Aircraft Corporation
Birmingham, Alabama

Fastening of Light Metals

We would appreciate obtaining a copy or copies of a table showing the relative strength of 5/16-18 American National vs. different depths of Lok-Thred as indicated in an article (The Fastening of Light Metals) in the March issue of your magazine.

Norman W. Bestor, Engineer
Automotive Engine Section
Development Division
Aluminum Company of America
Cleveland, Ohio

Would you please forward to us a copy of the table showing the relative strength of . . .

C. S. Hoffman
Engineering Department
Detroit Diesel Engine Div.
General Motors Corporation
Detroit, Michigan

ROSÁN®

PRESS BOLTS

Eliminate Tapping...

. . . An ideal fastening for fixed bolt or stud requirements in thick or thin sheet metals, extrusions, castings, etc.

. . . Rapid installation — punch or drill a hole (counterbore for flush application) and press the bolt into place.

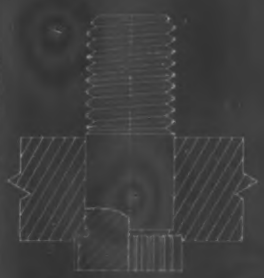
. . . The exclusive serrated head and undercut cause the parent material to "cold flow" and lock the bolt in place. This locking principle resists extremely high torque-out, pull-out and pull-through loads.

. . . Eliminates tapping threads in castings and extrusions.

. . . Eliminates soldering bolts to sheet metal.

. . . Available in sizes #2 thru 1/4" in both fine and coarse threads. Materials are carbon steel cadmium plated, and class 303 stainless steel passivated.

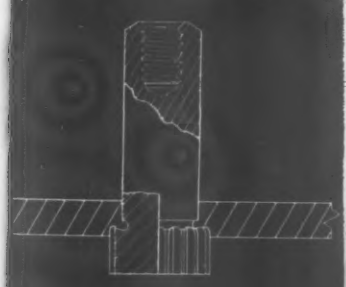
. . . For any fastening requirement specify ROSÁN INC. . . .



. . . in thick material

. . . in thin material

thru type bolt



spacer type bolt

locating pin type bolt

Designers and Manufacturers of the Worlds Finest Precision Fasteners

ROSAN INC. · 2901 WEST COAST HIGHWAY · NEWPORT BEACH, CALIFORNIA

Branch Offices: LOS ANGELES • SEATTLE • CHICAGO • DAYTON • DETROIT • NEWARK • FT. WORTH • WASHINGTON, D. C.

In Great Britain: INSTRUMENT SCREW CO., LTD.

U. S. A. AND FOREIGN PATENTS GRANTED AND PENDING COPYRIGHT 1959 ROSAN INC.

FRANK J. DECRANE, *Director of Purchases, Lamson & Sessions, tells why he believes...*

"Creative buying" plays a vital part in creating customers

AT L & S, we consider *creative buying* as vital as *creative selling*—in serving our customers most efficiently.

The "creative" part comes in working closely and continuously with our established sources, to improve our products and reduce costs. We frequently suggest improved or alternate materials—to do a better job at an established cost, or the same job at lower cost. EXAMPLE: on a type of raw material we buy in large quantities, investigations were recently carried out with several leading suppliers. Result—we're obtaining *a better product at a 27% saving*, now being reflected in reduced costs for our customers.

Creative buying offers other customer benefits, too. It means maintaining ample supplies of raw materials, so we can produce and deliver what you need without delay. It means throwing out "rubber-stamp" thinking—substituting imagination and ingenuity—to obtain production parts in emergencies.

Take advantage of this creative, customer-minded approach to purchasing at L & S, another reason why . . .

L & S Fastener Engineering helps you "tighten up" on...

- **PURCHASING COSTS**
- **INSPECTION AND HANDLING COSTS**
- **ASSEMBLY COSTS**

LAMSON & SESSIONS

5000 TIEDEMAN ROAD • CLEVELAND, OHIO

Plants in Cleveland and Kent, Ohio • Chicago and Birmingham

Use postpaid card. Circle No. 206

JULY, 1959 VOL. 1, NO. 10

ABETTING THE FORCES OF INFLATION

It used to be considered that quality and price go hand in hand. If you bought an expensive suit of clothes, it would wear like a million bucks. If you bought a $5000 car, it would give you several years of carefree, low upkeep driving. It was considered economical in the long run to pay a little more to get quality and endurance.

But that was back in the days when a dollar was worth at least 75 percent of its face value. But as creeping inflation subtracts more pennies from the dollar each month, this truism is being kicked to shambles.

Actually, you still have to use quality components and workmanship to get quality products. There's no way around it. But the twist to our truism comes from low cost imports—steel, cars, radios, machine tools, assembly equipment, and even fasteners.

And many of these imports are surprisingly high in quality. They have to be to suit the discriminating American taste. One of the best examples of this is the Japanese transistor radio which is of superb quality.

Imports of all types are being grabbed up by American consumers and manufacturers alike —because of one primary reason, low cost.

But what is American industry doing about this matter? Both labor and management are glibly going their own way—labor seeking ever higher wages, management seeking even higher profits.

It does not matter to labor that higher wages are forcing more automation with less manual labor—just as long as those still working get wage increases.

It does not matter to management that their total of unit sales is dwindling because of imports —just as long as they can raise their profit structures by raising prices and cutting costs.

It's time for action which is the prerogative of management. It's time for management to show more statesmanship in fighting inflation. It's time for management to use some of the money saved through automation to cut prices and meet foreign competition—instead of raising their profit structures. In short, it's time to start rescuing our way of life.

Matt E. Hensley

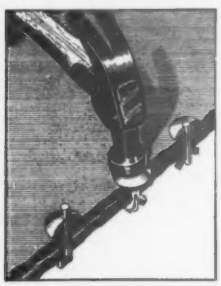
Managing Editor

MANY FACTORS CONTRIBUTE TO LOW INSTALLED COST OF SOUTHCO DRIVE RIVETS . . .

ECONOMICS OF FASTENING COVERS FULL CYCLE FROM INVENTORY REQUIREMENTS TO FINISHED PRODUCT

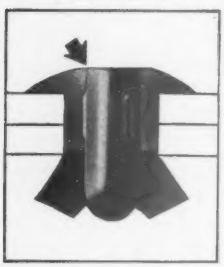
Designers who specify fasteners realize the many considerations that enter into cost determination. While ease of installation is often the most important feature, other factors affect costs. It may be difficult to put a dollar value on availability, for example, but serious financial losses do occur when production is held up or shipping dates are missed because of a slow fastener delivery. Being able to ship from stock, as Southco does, helps avoid production delays.

ELIMINATION OF SPECIAL TOOLS



Down time due to special tool failure and maintenance of special fastening tools are two fastening costs which are eliminated by Southco Drive Rivets. The only tool required is a hammer . . . any kind of a hammer . . . claw or ball, and size is not important. The number of men on a Southco riveting job is never limited by the number of special tools on hand and in working order.

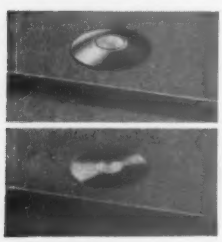
QUICKLY SET



To install, Southco Rivets are placed in drilled hole. The pin is then driven with a hammer. Installation is complete. No bucking is required.

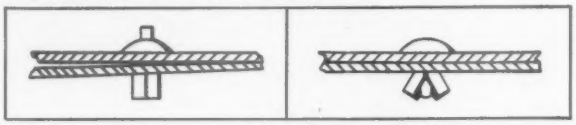
Expanded prongs force parts together. Pin is locked securely into rivet by displaced metal filling unique grooves. Compression forces are utilized for greater strength.

NO FINISHING OFF, NO WASTE



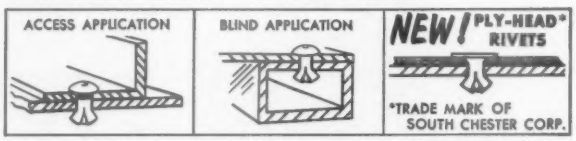
Impact of hammer seals pin neatly in rivet. No part of the rivet is cut off and discarded. No time-consuming filing, grinding or polishing is necessary. No scrap to clean up.

AUTOMATIC "PULL-UP" ACTION ASSURES TIGHT JOINT



Even when adjacent surfaces are separated, parts are forced together by Southco Rivet action, then held tightly in compression.

WIDE RANGE OF APPLICATION



Southco Drive Rivets are used to secure metal to metal or metal to wood. They are equally adaptable to blind or open applications. In each, they are quickly set and grip tightly. New PLY-HEAD* rivet permits higher loading of "soft" materials such as plywood, plastics and composition.

AVAILABLE IN ALUMINUM OR STEEL

Southco Rivets are supplied in aluminum or cadmium plated steel. The aluminum rivets have either cadmium plated or stainless steel grooved pins. The steel rivets have cadmium plated steel grooved pins.

Standard head designs are Universal or Countersunk. Full Brazier heads are available in popular sizes. New PLY-HEAD rivet rounds out line.

ALUMINUM

DIAMETERS	LENGTHS	NOMINAL GRIPS
1/8"	1/8" to 1/2"	1/32" to 13/32"
5/32"	7/32" to 3/4"	1/16" to 5/16"
3/16"	1/8" to 3/4"	1/32" to 5/16"
1/4"	7/32" to 3/4"	1/16" to 5/16"

STEEL

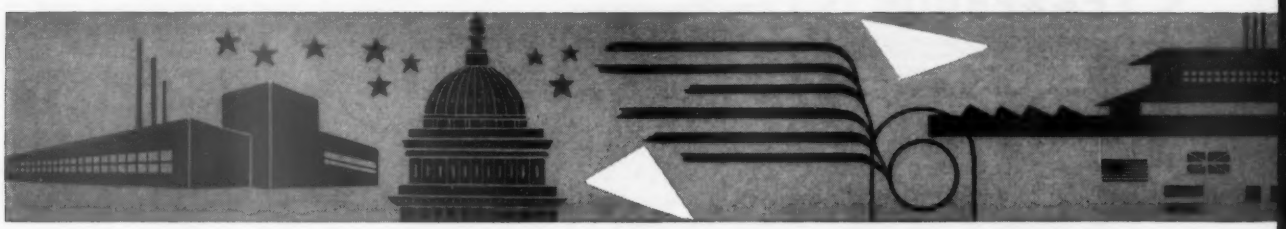
DIAMETERS	LENGTHS	NOMINAL GRIPS
1/8"	1/8" to 1/2"	1/32" to 13/32"
3/16"	1/4" to 3/4"	3/32" to 5/16"
1/4"	1/4" to 3/4"	3/32" to 5/16"

FREE RIVET FOLDER . . . Send for your free copy of "Southco Drive Rivets" Folder. Gives complete information on the application, installation, and specifications of aluminum and steel Drive Rivets. Write on your letterhead to Southco Division, South Chester Corporation, 257 Industrial Highway, Lester, Pa.

SOUTHCO FASTENERS
LION
©1957

Use postpaid card. Circle No. 207

The State of Business



LET'S BALANCE OUR BUDGET!

by the
Committee for Economic Development

President Eisenhower has submitted a budget of $77 billion for the fiscal year ending June 30, 1960.

This budget provides for cash spending of $93 billion. Existing tax rates, plus a recommended increase in the motor fuel taxes, are estimated to yield $93.5 billion. Thus the cash budget would be in balance; indeed, it would have a small surplus.

Let's consider the issues raised by the 1960 budget. Here are our conclusions:

1. Assuming economic recovery continues, the cash budget should be balanced. Any spending above the budget should be matched by additional taxes.

2. The government should also plan now for cash surpluses and debt reduction in subsequent years under conditions of high employment. Such surpluses would be a source of saving for financing private investment that would promote growth. They would also greatly reduce the risk of further inflation.

3. How large a contribution to national security would be made by additional military spending we do not know. The stakes are high, and spending that would contribute significantly to national security should be made, even at the cost of higher taxes. U.S. economic assistance to underdeveloped countries, which we regard as an essential element of the nation's security effort, should be enlarged beyond the program presented in the budget. At the same time, much remains to be done to increase the effectiveness of this program and to stimulate the flow of private U.S. capital and enterprise abroad.

This statement is by the 150-member Committee for Economic Development, a non-profit, non-political organization. On the Research and Policy Committee who drafted this report are chairman T. V. Houser, director, Sears, Roebuck; J. L. Block, chairman, Inland Steel; Edmund Fitzgerald, chairman, Northwestern Mutual Life Insurance; E. G. Collado, treasurer, Standard Oil (N.J.); George Russell, executive vice president, General Motors; H. C. Peterson, president, Fidelity-Philadelphia Trust; D. G. Mitchell, president, General Telephone & Electronics and 39 other leading businessmen and educators. Copies of the 44-page "The Budget and Economic Growth" are $.50 from CED, 711 Fifth Ave., New York 22, N.Y.

4. Domestic nonsecurity spending should be held to budget provisions. Any proposal for an increase should be tested by the requirement of higher taxes to pay for it. Some increases will pass this test, but they would be very few. In fact, many domestic programs should be cut. A larger **volume** of Federal spending will not necessarily increase the rate of economic growth, any more than a larger volume of private spending. What counts is whether **particular** expenditures will increase the production potential of the economy.

FEDERAL BUDGET EXPENDITURES FY 1960
(In Millions of Dollars)

	Fiscal '60 Current Est.	Change from Fiscal '59 Estimated	Change from Fiscal '58 Actual
Major Nat'l. Security	$45,805	— 815	+1,663
Internat'l. Affairs & Finance	2,129	—1,579	— 105
Veterans' Services & Benefits	5,088	— 110	+ 62
Labor & Welfare	4,129	— 251	+ 682
Agriculture & Agric. Resources	5,996	— 779	+1,607
Natural Resources	1,710	+ 2	+ 167
Commerce & Housing	2,243	—1,266	+ 134
General Government	1,735	+ 62	+ 379
Interest	8,096	+ 495	+ 407
Allowance for Contingencies	100	— 100	+ 100
	$77,030	—3,841	+5,094

5. A tax increase should not be necessary. But, if the net of Congressional actions plus revisions of spending and revenue estimates is to create a prospective cash deficit for the fiscal year 1960, taxes should be raised before Congress adjourns.

We face three real, critical tests:

1. Do we have the determination to do the things necessary to keep our defense strong for a period of indefinite duration?

2. Are we prepared to play our part, by both military and economic means, to protect and promote freedom in the world?

3. Do we have the will to prevent inflation while seeking the highest sustainable economic growth?

It may seem odd to put inflation in so ominous a list. We have survived inflations in the past. But never before World War II did we have the prospect of inflation in the conditions that now prevail.

First, there is the general expectation, realistically based on public policy, that the price level will never go down. Second, there is a tendency to turn to the government to solve problems by direct

continued

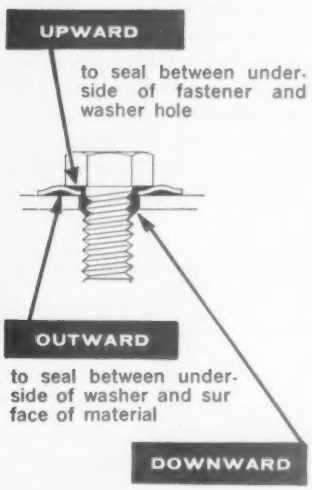
MAKE FASTENERS LEAKPROOF

WITH BARTITE® SEALING WASHERS*

NOW—a permanent barrier against liquids or vapors . Bartite Sealing Washers with any fastener to seal against flat or curved surfaces.

3-WAY ACTION

GIVES COMPLETE SEAL


UPWARD
to seal between underside of fastener and washer hole
OUTWARD
to seal between underside of washer and surface of material
DOWNWARD
to seal between clearance hole and fastener threads

BARTITE sealant material is an integral part of the metal washer, a single unit, ready for quick assembly and positive sealing action.

The sealant is chemically inert . . stable and non-aging . . . will not split or ozone check . . . withstands wide extremes of temperature and pressure . . . retains plasticity indefinitely . . . seals against water, oils, acids, alcohols, hydrocarbons, etc. Available in sizes to fit fasteners through ½" diameter in choice of metals and finishes.

Get rid of fastener leakage—specify BARTITE for permanent sealing. Write for samples and descriptive bulletin B-18.

*Patents Pending U.S.A. and Foreign.

BARTITE PRODUCTS CORP.

Subsidiary of L. J. BARWOOD MFG. CO., INC.

10 Williams Street Everett 49, Mass.

Use postpaid card. Circle No. 208

control of the economy. This would be a fundamental and disastrous departure from the free American economy.

The processes of budget-making in government are not well suited to capitalizing on such responsibility as does exist. After the President's budget is submitted to Congress, principles of budget policy continue to be discussed but they have a diminishing influence on decisions.

Therefore, the President should be given the authority to veto or reduce individual items in appropriation and authorization bills.

The government is spending too much money on many items: agricultural programs, veterans services and benefits, public assistance, and housing and related activities.

These are expected to amount to $15.5 billion in fiscal year 1960, more than 30% larger than they were five years ago. These should be curtailed.

It is difficult to make substantial reductions in most of the Federal activities overnight. But we are concerned that Congress is now in the process of committing the Federal government for substantially higher future spending.

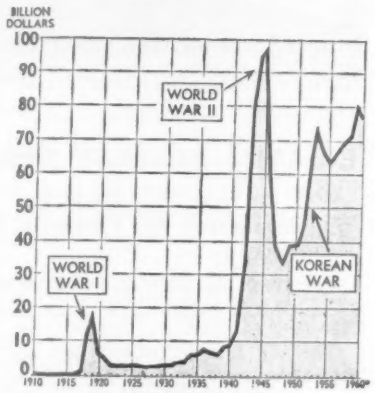
We do not believe a tax increase should be necessary. But the alternative—an inflationary fiscal policy—is an even greater evil. It would be difficult enough to contain the upward price pressures during periods of economic expansion even if the budget were in balance. It would be impossible to do so if the government were in perpetual deficit financing.

The best approach would be to call a halt to the continuing raids by politically powerful pressure groups on the Treasury. If Congress is unwilling to resist these pressures, it should raise enough money through taxes to pay for the outlays it approves.

Inflation imposes a heavy tax on many people in our society living on fixed incomes. The value of the dollar would be cut in half in 23 years if prices increased at the rate of 3% per year, and in 14 years if they rose 5% annually.

We can not pretend any longer that a dollar will remain a dollar if we have no intention of protecting its value! •

50 YEARS OF GOVERNMENT SPENDING



*Estimate in Pres. Eisenhower's Budget Message to Congress

Industry Briefs

Five steel strikes since 1946 have ranged from 12 hours to 54 days . . . Aluminum content will average 72 lbs. in "Big Three's small cars, up to 20 lbs. from present models. More plastics will cut machining costs . . . Electrical appliance sales are 30% higher this year . . . Jets are credited by American and TWA for increased business. United has added seven more to its order for 11 Boeing 720s for early 1961 . . . Kerosene comeback is due to jet consumption of cheaper fuel. Sales now 2½ times 1925 pace when popular home fuel . . . Oil refineries cutting back on 7.9 million barrels daily output (7.3 last year), with oversupply causing price drops . . . Aircraft $3 billion R&D outlay last year was 40% of all industry's . . . Industry okayed $2.6 billion for capital expansion in first quarter, 37% increase over '58. Steel tops; gains in all but chemicals . . . Rails plan to meet the St. Lawrence Seaway challenge with rate reductions on bulk commodities . . . Machine tool orders rising slowly. Metal-cutting tool orders expected to top $500 million, compared to $281 in '58, $519 in '57 . . . Total number of businesses in U.S. now 4.6 million up 55,000 in one year. •

Special Fasteners

Bethlehem makes the widest variety. Those you see here are just a small sample of the steel specialties we can produce. And our fasteners engineers will help you design products, whether they are headed, threaded, slotted or pointed. Try us. Our Lebanon, Pa., plant is geared to turn out your order fast.

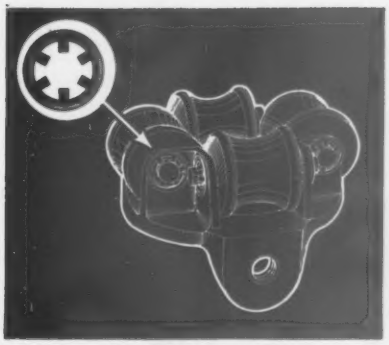
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

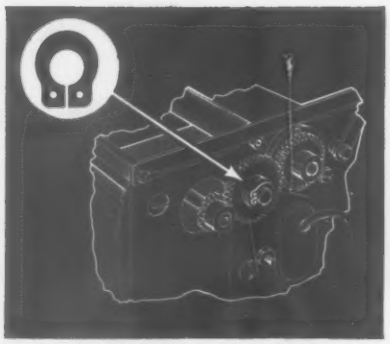
BETHLEHEM STEEL

BETHLEHEM STEEL

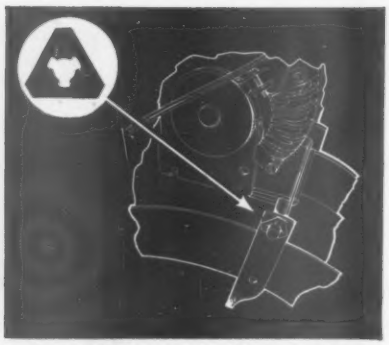
Use postpaid card. Circle No. 209



Drilling and flaring eliminated. Easier maintenance, a time saving of 50% and elimination of costly, time consuming drilling and flaring operations result when Truarc Series 5115 self-locking rings are used to retain rollers on pins in this electric cable guide. Extra long prongs enable ring to accommodate wide shaft tolerances.

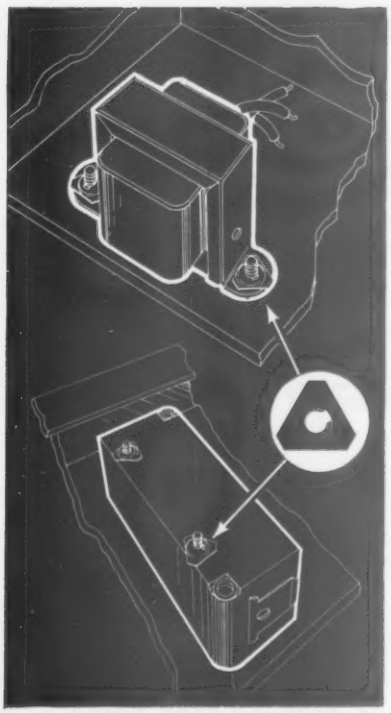


Economical fastening for idler gear. Installing Truarc Series 5555 Grip Ring flush with hub insures precise seating of gear in this portable electrocardiograph assembly. What's more, the ring eliminates a nut and costly stud-threading operation of alternate design. **Typical savings amount to $365 per 1000 units.**



Cross-drilling and cotter pin eliminated. Here a Truarc Series 5305 self-locking triangular retainer replaces a cotter pin used to hold an electric-motor mounting bar. Both the cotter pin and the cross-drilling operation required in the original design are eliminated. **Typical total savings amount to $120 per 1000 units.**

Truarc self-locking retaining rings boost economy in wide variety of designs



Easy way to mount electrical-electronic parts. Truarc Series 5300 triangular nuts replace conventional nuts and lockwashers in mounting electrical parts like transformer (top) or Microswitch (bottom). Dished body of Series 5300 flattens under torque, eliminates need for lockwasher, simplifies handling and assures assembly.

...eliminate parts, machining, speed assembly

Easy application, elimination of more expensive conventional fasteners and reduction or elimination of machining operations are just a few of the savings resulting from the proper use of self-locking retaining rings. Rings replace threaded retainers and nuts, hairpin-type cotter pins, and a variety of cut, lock, and plain washers. They require no groove, or preparatory machining operations. Rings can be installed by unskilled labor, seated at any point on the shaft, automatically taking up any accumulated tolerances.

Four ring types are shown. One has a dished triangular body which locks the fastener on the shaft under spring tension, holds under moderate shaft tolerances and against extremely heavy thrust loads. Another, a re-usable Grip Ring, is ideal for ungrooved shafts, tubes, bosses, and studs. A third type is a triangular free-spinning nut with a dished body that flattens under torque, eliminating need for separate lock washers. The fourth, a push-on type, has an arched rim to provide high strength and extra long locking prongs which accommodate wide shaft tolerances.

These are but four of the 50 functionally different types of Truarc retaining rings. They come in 740 standard sizes, 6 metal specifications, 13 different finishes. The entire Truarc line, including assembly tools, grooving tools, and 80 typical cost-saving applications, is covered in the new catalog RR 10-58. And remember, Waldes engineers are always ready to help you solve your application problems—whether they involve one of the standard Truarc rings or a "special" to fit your particular requirements. Waldes Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. 9.15

WALDES TRUARC® RETAINING RINGS

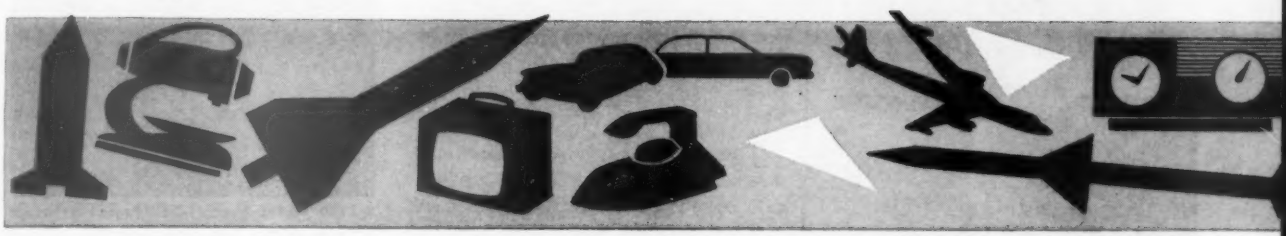
Waldes Kohinoor, Inc., Long Island City 1, N. Y.

TRUARC RETAINING RINGS . . . THE ENGINEERED FASTENING METHOD FOR REDUCING MATERIAL, MACHINING AND ASSEMBLY COSTS

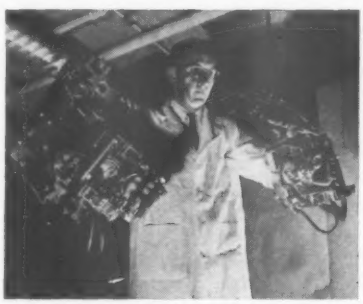
©1959 WALDES KOHINOOR, INC.

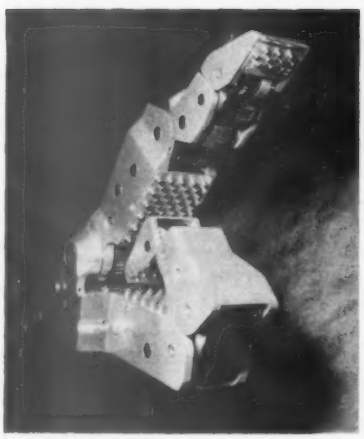
Use postpaid card. Circle No. 210

Industry at Work



G.E. 'ROBOT' IS FIRST SERVO MANIPULATOR WITH HUMAN-HAND DEXTERITY





G. E. project engineer Ralph Moser (above) dictates machine's 20 movements from a master control harness. Close-up photo (right) shows the joints in Handy-man's hand. The open thumb and curled finger are capable of grasping objects.

This hydro-mechanical slave can twirl a hula hoop with ease. Machine will be used by the AEC.

A machine that represents mankind's closest approach yet to the amazing robots of science fiction has been invented by the General Electric Company.

It feels and hears—and soon will be able to "see" by means of three-dimensional, closed circuit television. It is the first such machine ever made that can simulate the clutching motion of the human hand, even to unscrewing a bolt.

"Handyman" was created by the General Engineering Laboratory for GE's Aircraft Nuclear Propulsion Department. It will go to work on components of aircraft nuclear propulsion systems behind the seven-foot-thick walls of the "hot shop" at the AEC's National Reactor Testing Station near Idaho Falls, Idaho.

A unique arrangement allows the operator to maintain continuous control over 20 independent motions. A roughly comparable situation would be the operation of the basic flight controls (rudder, elevator, aileron) of six independent airplanes.

The "hand" has five motions which are: two in the finger, two in the opposing thumb and one at the wrist.

The forces encountered by the slave unit are reflected back to the master controls in such a manner that the muscular sensations the operator experiences are similar to those he would feel if he were to perform the task indirectly. The ratios of force reflected back to the operator can be adjusted in increments of 3 to 1, 5 to 1, 10 to 1, and 0 force reflection. The ratio 3 to 1 means 3 lbs. of the slave unit results in 1 lb. force reflected at the master unit.

Electrical signals are converted into hydraulic forces by electro-hydraulic servo valves. Servo valves and hydraulic actuators are located together near the point of force demand. These juxta-positionings have reduced the number of hydraulic lines needed to distribute hydraulic power to each servo valve. Thus, the hydraulic lines are connected in a "Christmas tree" pattern of distribution rather than many parallel lines.

The system represents a tremendous advance in

continued

HOW
to make Screwstick your own

Profit Improvement Program

Look here

at how quickly and easily Screwstick loads into a power driver. Just insert Screwstick and the entire stick of screws feeds automatically. Improves profit because Screwstick can cut assembly time in half.

Look at the one-hand operation you get with Screwstick. Operator can position parts with one hand, fasten with the other. Constant measured torque produces uniform tightening. Send for a free sample of Screwstick — another example of the way you benefit from American's Profit Improvement Program.

Look here

Profit Improvement Program

Buy here

The Biggest News in Fasteners comes from

American
SCREW COMPANY

Willimantic, Conn.
Detroit, Mich.
Chicago, Ill.

Use postpaid card. Circle No. 211

the design of manipulators. One of the key designs is the slave forearm assembly, including five actuators, five servo valves, five selsyns and five tachometers. They represent the control and execution of power totalling 20 horsepower. The servo valve and piston package is 4″ in diameter and 6″ long.

The master unit is mounted on a platform which is on wheels and can be raised or lowered, and rotated about a vertical axis with respect to platform.

Despite apparent complexity of the equipment, a problem in any of Handyman's 56 servo loops can be traced back to its source in less than 10 minutes. Because of the modular type design of the electronics, there are very few variations in the parts and replacement is very simple.

The master unit operates with hydraulic pressure of 1100 psi; and the slave unit with a pressure of 1500 psi.

The hand is approximately twice as strong as that of a man's. The slave arms can be extended one from the other a maximum distance of 9′. When extended, each slave hand can lift 75 lbs. Not fully extended, the hand can pick up more weight.

WATER TEST inspectors at Dodge sit through showers nearly five times greater than the heaviest recorded rainfall in U.S. history (.65 of an inch in one minute on Apr. 5, 1926 at Opid's Camp, Calif.). Water, under 30 lbs. pressure, sprays the car from every angle.

Ralph Mosher, project engineer, believes the ultimate may be a system in which the slave manipulator is set in motion and controlled entirely by flexible and automatic programming.

Each slave arm and hand moves independently of the other. What corresponds to the fleshy palms of the human hands are small spring-loaded buttons on Handyman. These help the manipulator hold onto irregular-shaped objects.

The system is composed of five units—master, slave, electronic console and two hydraulic pump units which circulate hydraulic fluid through the master and slave units.

EXPLORE INDUSTRIAL USES FOR MISSILE TV SYSTEM

A tiny battery-powered television system, weighing only nine pounds yet rugged enough to withstand the crushing forces of being rocketed into space, was unveiled at the Lockheed Missiles and Space division in Sunnyvale, California.

Scientists Samuel Schwartz (right) and Daniel Hochman, display miniaturized missile-borne television system they designed.

The entire system consisting of a camera and three small units which easily fit into a brief case, has a 1000-mile transmitting range and its picture transmission quality compares with commercial TV. First units have been delivered to the Army Ballistic Missile Agency.

The TV system includes, besides the 42-ounce camera, the fully transistorized control unit, weighing 42 ounces and which supplies all necessary sweep and synchronizing signals to the camera; a 14-ounce unit containing camera controls, and a 50-watt FM transmitter weighing 47 ounces.

The system, powered by a 28-volt dry cell battery, has passed the most rigorous testing, in-

cluding 40 Gs of shock (40 times the force of gravity), 50 Gs of acceleration and 10 Gs of vibration. Fifty Gs has been likened to the force produced by a jet plane smashing into a concrete wall at 1100 mph.

Commercial potentials could be in the fields of aerial navigation, meteorology, oceanography, railroading, observation of radioactive or similarly contaminated areas, and law enforcement, as well as television news coverage.

TESTS FROM ATOM BLAST FORCE IN PRESSURE VESSEL

A unique device that permits engineers to test materials by subjecting them to the explosive force of an atomic bomb, but without the use of any radioactive materials is being used in the Naval Civil Engineering Laboratory at Port Hueneme, Calif.

The unit consists of a 20-ton steel pressure vessel, roughly cylindrical in shape, mounted on top of a 75-ton heavily reinforced concrete pier. Engineers place the item to be tested, such as a beam, inside the steel shell. A firing tube, also contained in the shell is loaded with enough primacord explosive to produce the desired blast.

The test device is officially known as an Atomic Blast Simulator, but because of difficulties in building it, workmen dubbed it the "Trojan Horse." Navy engineers refer to it, in honor of its creator, W. W. Boynton, director of Boynton Associates, of La-Canda, Calif., as the "Boyntonsaur."

IS BURNABLE METAL THE NEXT AIRCRAFT FUEL?

J. R. Branstetter, aeronautical research scientist at the National Advisory Committee for Aeronautics—Lewis Research Center, Cleveland, Ohio, told the ASME that if American aircraft are to surpass their competition in thrust and maneuverability, an "all-around fuel" must be found to replace petroleum as an energy source.

Burnable metals such as boron, beryllium, aluminum, graphite, dibroane and pentaborane are now being studied from both cost and performance standpoints. •

Tips to help you cut impact socket breakage

- Position power wrench so that socket fits straight on nut. Tilted wrench causes binding and socket breakage.
- Use right size socket . . . replace worn or undersize nuts. Loose-fitting sockets wear faster — then break.
- Don't keep impacting after nut is tightly set. This causes needless wear on both wrench and socket.
- Keep the inside of sockets clean. Dirt and grease are common causes of socket breakage.
- When power wrench drive head becomes worn — replace it. Loose drive causes excess wear in socket drive opening — early socket breakage.

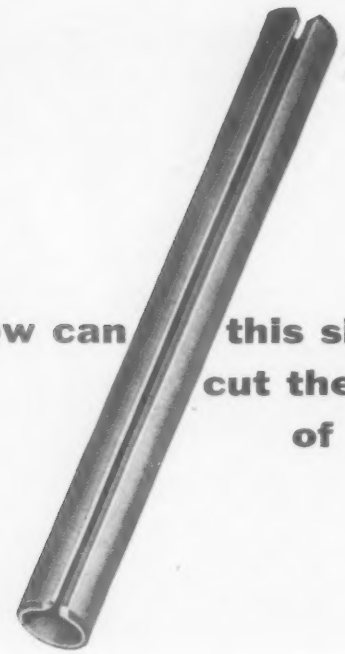
Best tip yet!

ALWAYS USE *Snap-on* INDUSTRIAL SOCKETS

Sockets used on power nut runners and impact wrenches take a terrific pounding. Standard hand-wrench sockets are not designed for this work. *Snap-on* heavy-duty industrial sockets have the extra heft and toughness to take the beating. Result: more work-hours per socket and, equally important, less costly downtime resulting from frequent breakage of ordinary sockets.

Final tip. Talk sockets with your *Snap-on* man. Take advantage of his specialized tool knowledge, and his competent advice on what is best for you in the wide range of *Snap-on* industrial sockets. Your nearby *Snap-on* branch office provides prompt emergency or regular service.

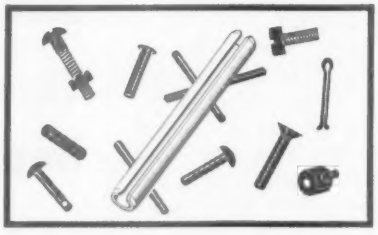
SNAP-ON TOOLS
CORPORATION
8033-G 28th Avenue • Kenosha, Wisconsin
Use postpaid card. Circle No. 212



How can this simple fastener cut the cost of your product?

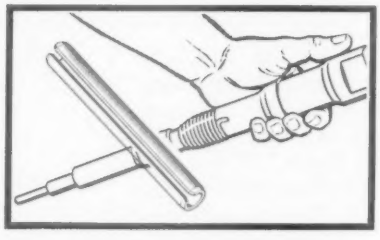
Rollpin aids standardization and reduces inventory

Rollpin readily replaces taper pins, grooved pins, straight pins and set screws; it can be used as a locating dowel, hinge pin, cotter pin, stop pin or, in some applications, even as a rivet. Thus, when you standardize on a Rollpin you can drastically reduce the variety of fasteners in your inventory—save money in purchasing, storage space and stock handling.



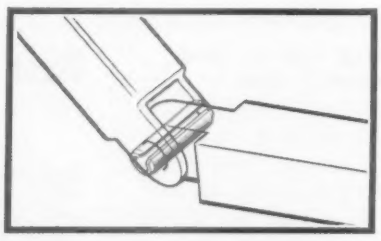
Rollpin simplifies production processing . . . saves man-hours

When you use Rollpin you can eliminate costly precision drilling, or tapping operations. And there's no need for any secondary locking operation—such as lock wiring or peening. That's because Rollpin is a slotted tubular steel spring whose chamfered ends drive easily into standard production-drilled holes, compressing as driven. The spring tension against the hole walls retains Rollpins securely against severe vibration. Independent studies have shown that installed costs of Rollpin are as much as *91% less* than those for a dowel pin or *95% less* than the installed cost of a taper pin.



Rollpin simplifies product maintenance

Only a drift pin or standard punch is required to remove a Rollpin. The slotted tubular shape and the spring action principle do not damage hole walls or enlarge the original hole diameter. Consequently the same pin is easily re-inserted and can be used again and again. Mail our coupon today for the complete Rollpin story.



ROLLPIN®

a product of

Elastic Stop Nut Corporation of America

Dept. R58-797, Elastic Stop Nut Corporation of America
2330 Vauxhall Road
Union, New Jersey

Please send the following free fastening information

- ☐ Rollpin bulletin
- ☐ ELASTIC STOP® nut bulletin
- ☐ Here is a sketch of a fastening problem. What ESNA® fastener would you recommend?

Name_____

Title_____

Firm_____

Street_____

City_____ Zone____ State_____

Use postpaid card. Circle No. 213

Assembly and Fastening Ideas

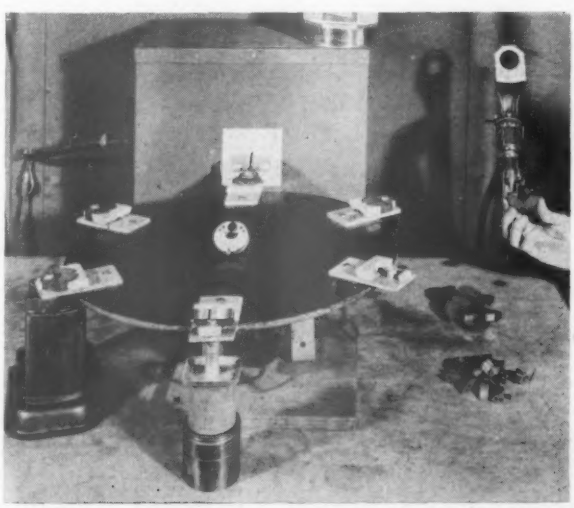
HANCOCK CUTS PARTS PURCHASING RED TAPE

One firm is making sure it is getting the best possible prices it can on fasteners, and with minimum delay.

Hancock Mfg. Co. in Jackson, Mich. hangs a sample of each part currently being used on a display board in the plant lobby. Each part, identified by number, is enclosed in a transparent plastic envelope.

A sign says: "Can you suggest a source to save us money on these parts? Please fill in card and we'll supply the prints."

Leo Henning, purchasing director, says that the average is better than one request card per day. Time has been saved in purchasing since salesmen who want to quote on parts will fill out cards before coming into the office. Then the engineering department simply mails out prints.



Finished cost of this partially assembled automatic soldering line is under $700. Savings in one year of use were estimated at $3000.

Though the project is too new to estimate cost savings, Hancock reports that salesmen appreciate knowing what parts the company uses.

AUTOMATIC SOLDERING QUADRUPLES OUTPUT

Over 400% increase in production of magnet assemblies was reported by a prominent instrument manufacturer after automating his soldering line. Output on one line increased from 500 to over 2000 assemblies per day.

The process incorporated the use of paste-type solders: standard solders combined with special fluxes in stable paste.

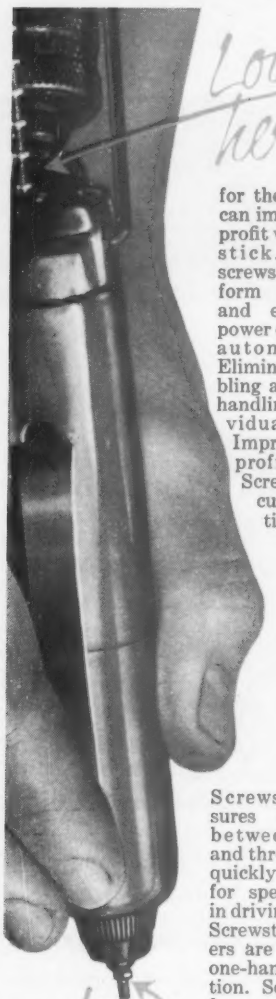
Formerly, an operator deposited solder onto the joint manually before locating the parts in the fixtures. Time studies revealed that the application of solder and flux to the parts consumed 75% of the cycle time. This resulted in a painstaking operation with many rejected parts which had to be cleaned and resoldered.

Process engineers from Fusion Engineering of Cleveland, Ohio, redesigned the operation in the following ways: 1) An automatic paste solder applicator was installed in the production line to feed

continued

Screwstick is a

PROFIT IMPROVER



for the ways you can improve your profit with Screwstick. These screws in stick form load fast and easy in a power driver, feed automatically. Eliminates fumbling and tedious handling of individual screws. Improves your profit because Screwstick can cut assembly time in half.

Screwstick insures alignment between screw and threaded hole quickly. No need for special skills in driving because Screwstick drivers are made for one-hand operation. Send for a free sample of Screwstick.

Look here

Profit Improvement Program

Buy here

The biggest News in Fasteners come from

American
SCREW COMPANY
WILLIMANTIC, CONN.
Chicago, Ill.
Detroit, Mich.

Use postpaid card. Circle No. 214

a metered amount of paste solder to the parts during assembly.

2) An automatic indexing table was installed to carry the parts under the heat source (induction heater), cool and eject the parts.
3) Ceramic fixtures were built into the table to hold the parts during soldering, eliminating heat loss through the steel table.

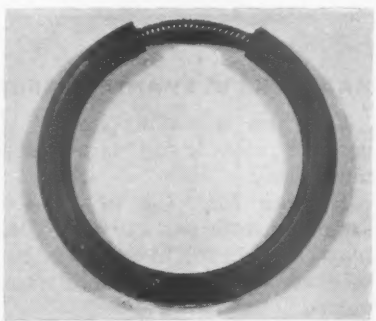
During the assembly of the magnet and the pole pieces into the new ceramic fixtures, the magnet is brought into position under the dispensing gun nozzle and an exact metered amount of material is applied to each end of the horseshoe magnet. The magnet assemblies then pass under an induction heating coil where the soldering is completed. Subsequent stations are used for cooling and ejection of the finished parts.

Assembly time for the operation was reduced from 75% of the cycle time to less than 25% by applying Fusion paste solder automatically.

CHANCE VOUGHT DEVELOPS NEW HYDRAULIC O-RING SEAL

Chance Vought Aircraft Research has tested a new hydraulic O-ring seal which could eliminate need for anti-extrusion devices at high temperatures.

The seal differs from conventional O-rings by employing a spring insert concentric with the O-ring. It has particular application in a nuclear environment where the use of Teflon back-ups is not considered suitable. Other applications include hydraulic seals at temperatures above 400° F. as well as high temperature pneumatic seals.



Performance consistent with at least the following conditions is the goal of further development: temperatures: —65 to 600°F; pressures: 0 to 4000 psi; cycling: 35 cpm, variable stroke from 1 to 5"; compatibility with a variety of high temperature fluids and resistance to hot air and/or other gases.

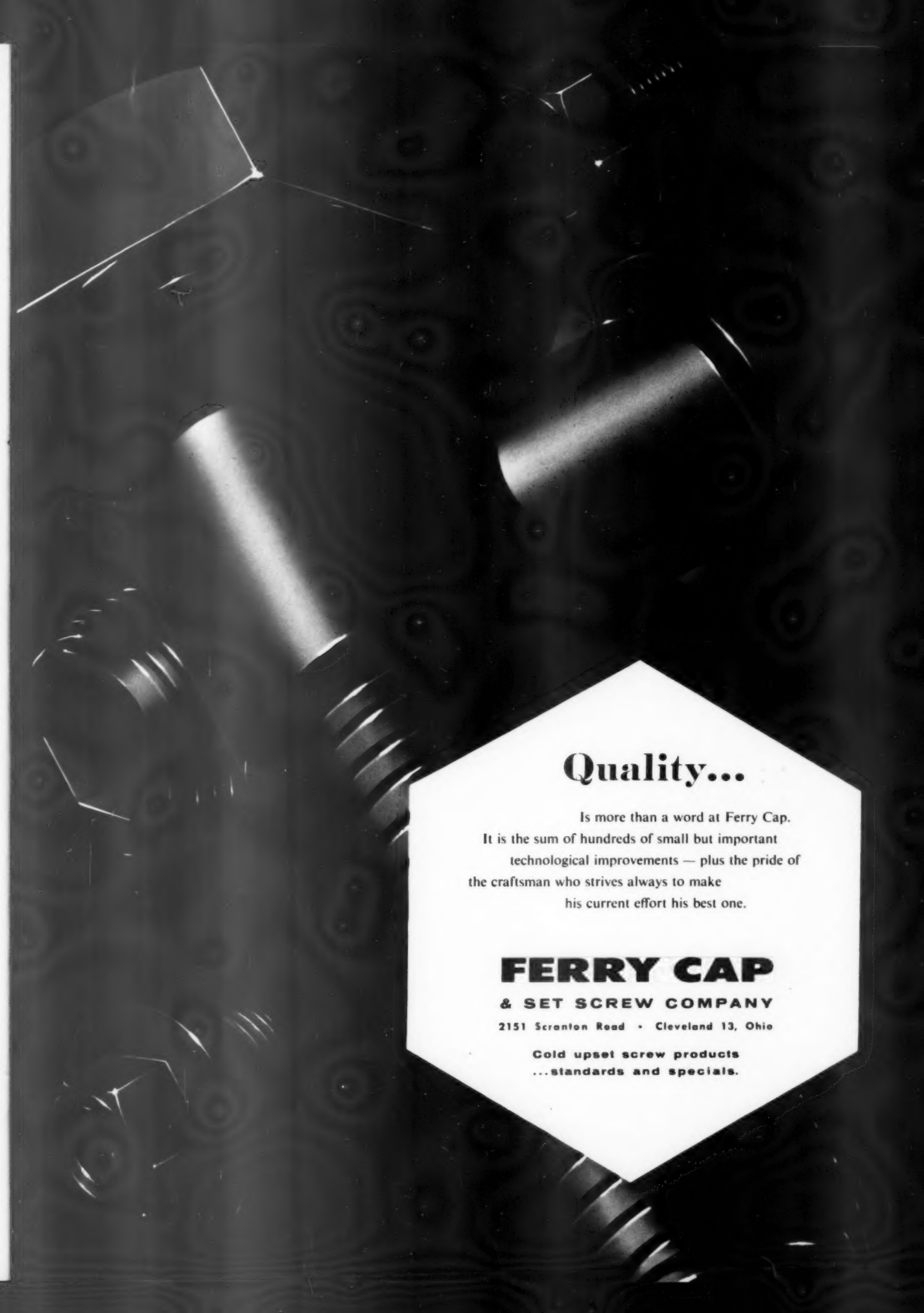
CLAMPS CUT COIL BINDING TIME 600 PERCENT

By using clamps, Electric Products Co., Cleveland, has slashed the time required to bind armature coils from thirty-five to five minutes.

Clamps are installed over a 1" protective strip of impregnated cloth. They are locked with a bend-over, break-off stroke, soldered, varnish coated and baked.

Under actual tests the clamps withstood centrifugal forces generated at 1500 to 3600 rpm's. Armatures up to 7½" in dia. tested out satisfactorily.

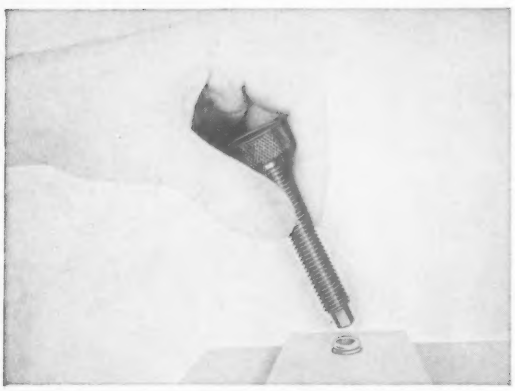
Information and data is available from the Punch-Lok Co., 32 N. Justine St., Chicago 7, Illinois.


Quality...
Is more than a word at Ferry Cap.
It is the sum of hundreds of small but important
technological improvements — plus the pride of
the craftsman who strives always to make
his current effort his best one.
FERRY CAP
& SET SCREW COMPANY
2151 Scranton Road • Cleveland 13, Ohio
Cold upset screw products
...standards and specials.

Practical Design Tips

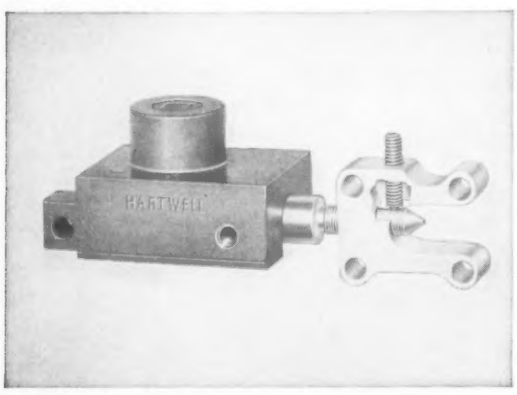
No. 3 of a series

Perhaps the applications shown below will suggest ways you can profit from the use of Vlier tools. Many companies have simplified product design—with resultant savings—by substituting these simple, off-the-shelf items for complicated custom devices.



TO LIMIT TORQUE APPLIED TO SOCKET SET SCREWS grind the screw end of a Vlier Torque Thumb Screw to the proper size hex. The amount of torque can be quickly adjusted between 10 lbs. and 125 lbs. Once set torque is reached, knurled ring spins freely, preventing overtightening. Backing off is positive.

TO SECURE THE DUPLICATOR CARRIAGE of this metal fabricating machine when not in use, the manufacturer uses two Vlier Swivel-Pad Torque Thumb Screws. These simple holding tools with the unique ball-joint pad construction, limit the amount of torque which can be applied, and prevent scoring or damage to the ways. Vlier Swivel-Pad Torque Thumb Screws such as used in this application are available in various sizes and end pressures.



TO PROPERLY POSITION THIS YOKE-SHAPED PART for entrance into a latch assembly, a Vlier S-58 Spring Plunger is used. The threaded stud, extending horizontally, is slotted on two sides. As the stud is rotated, the spring plunger snaps into the slot assuring the proper position of the yoke. Vlier Spring Plungers are available in six nose types; various end pressures.

NEW 1958 CATALOG NOW AVAILABLE—Eight pages; completely revised. Includes information and specifications on all new Vlier products, including the Torque Handle, Stock Pusher, Leveling Pad. Makes ordering easy. Suggests new uses for these proven time-savers. Write for your copy today!

VLIER
Engineering Corporation
A subsidiary of Barry Controls, Inc.
8900 Santa Monica Blvd. • Los Angeles 46, California

Use postpaid card. Circle No. 216

BUILDERS REPORTEDLY SPEED BRIDGE ERECTION 10 TO 20 DAYS BY USING BOLTS

By using high strength bolts to join sections, Karl Koch Erecting Company, Inc., erected the steel work for a 1250 foot continuous girder bridge in just 35 working days—an estimated 10 to 20 days faster than other methods.

High-strength bolts are being driven with Ingersoll-Rand model 534 tool. Snap-On torque wrenches and Skidmore torque gages were also used on the bridge erection job.

A total of 44,000 high strength bolts, supplied by Russell, Burdsall & Ward Bolt and Nut Co. were used in the new bridge spanning the Methuen River on New Route 28 in Mass. Sections of the five-girder bridge, made up of five spans over the river, plus approaching spans, were lifted into place and fitted up with the high strength bolts. Special fitting-up bolts were not required. Bolts were tightened to a predetermined torque by pneumatic torque-controlled wrenches. Only simple scaffolding was required.

One man tightens the nut with the torque wrench while the second holds the bolt head with a hand wrench. Where it is difficult to reach the nut, the bolt is tightened with the torque wrench. Koch's bolting teams were able to install about 290 fasteners per day.

Made to ASTM material specification A325, a 1-inch high strength bolt tightens to a tension of 42,000 lbs. So long as external loads don't exceed residual tension applied in tightening, bolts will last indefinitely without maintenance.

THREADED WIRE INSERTS RESIST VIBRATION, STRENGTHEN SLIDE FEEDER ASSEMBLY

Mounted on a shear, brake or press, Cooper-Weymouth slide feeders are subjected to continuous hammering from 50 to 150 strokes a minute. Repeated vibration of the feeder used to shake loose bolted assemblies and accelerated thread wear on holes that joined each piece together.

By utilizing a self-locking stainless steel wire thread insert in 24 tapped holes, Cooper-Weymouth has improved product design and eliminated a subsequent maintenance problem.

The feeder consists of three basic parts fastened on a steel base which can be mounted directly on a press bolster plate: a feed block, a three-way shut off valve and an air-powered motor.

To provide sufficient rigidity and strength, the component parts are mounted on end and side plates which are fastened to the ⅝" chassis plate. Accordingly, socket head cap screws and set screws are employed for assembly in tapped blind holes throughout. To achieve sufficient rigidity, all holes were tapped relatively deep —1" for ⅜" and 5/16" bolts and 1¼" for ½" bolts.

An oversize tap threads the hole in the feed block housing.

Under vibration, all connections in the feeder unit are held securely against loosening by a "grip coil" near the center of the Heli Coil screw-lock insert. This locking coil approximates a polygon in shape instead of being circular. As a bolt is run through the insert, the grip coil is forced to conform to the thread circle. The chord of the coil maintains a strong, spring-like pressure on the bolt, giving a locking effect which is not impaired through repeated disassemblies.

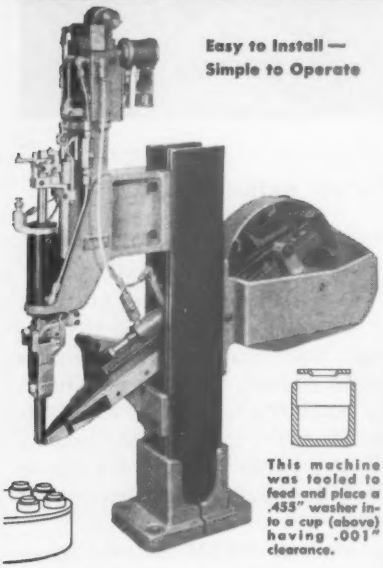
The flexibility of the wire insert provided a unique solution to the problem of maintaining correct thread form in a heat-treated part threaded into the end frame. A stop button, used to limit the

continued

FOR TIMESAVING ASSEMBLY OF SMALL PARTS

DIXON *Auto-Positioner*

IN FOUR STANDARD MODELS



Easy to Install — Simple to Operate

This machine was tooled to feed and place a .455" washer into a cup (above) having .001" clearance.

- *New Positive-Acting Feeder*
- *Automatic Sensing Device*

The Dixon Auto-Positioner is a compact, air-operated automatic assembly machine for parts from 1/16" to 2" size at speeds up to 6000 cycles per hour. It is furnished as a fully automatic station for use at a dial or in-line transfer table, or as a self-contained machine with pedestal and fixture table. There are four models, providing a selection of equipment to suit your requirements.

Dependable, Accurate, Compact

The new parts feeder is simple, compact (only 6 inches wide), and efficient. It provides positive advancement of the part into the chuck; it has a straight track and a positive-acting escapement; and it requires no separate motor or vibrator. Automatic sensing assures quality control. It interrupts the cycle when a part is missing or improperly assembled.

Standard Equipment, Easily Retooled

The chuck, positioning punch, and feeder tooling are easily modified or replaced for other jobs. Compactness permits close nesting at multiple stations, cutting cost of fixtures, dials, or transfer devices.

DIXON

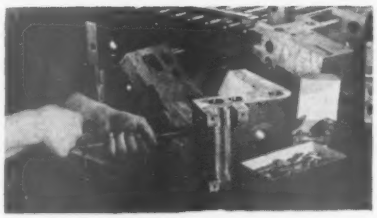
Send for Bulletin AP-B2 or request our machine planning service.

DIXON AUTOMATIC TOOL, INC.
2309 - 23rd AVENUE • ROCKFORD, ILLINOIS

Equipment for Automatic Parts Handling and Assembly

Use postpaid card. Circle No. 217

travel of the feed block is subjected to a severe impact with each feeding movement. The block is heat-treated for strength. To solve the problem of retaining proper thread size the piece was drilled and tapped with a Heli-Coil tap before the heat treating operation. After the heat-treat, a 3/8-24 insert was installed and the flexibility of the wire insert compensated for any distortion of the tapped threads.



Final step before assembly of the feeder is installation of 24 screwlock inserts. The last coil is 3/4 to 1 1/2 turns before the surface of the tapped hole. Spring tension retains the insert.

TV PRINTED CIRCUIT BOARDS ASSEMBLED AUTOMATICALLY

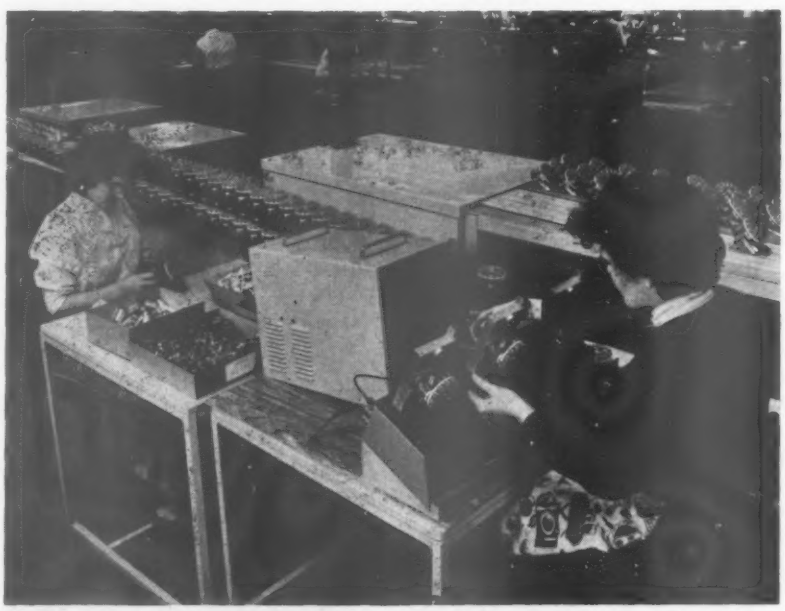
New methods of automatic assembly of television receivers have enabled Thorn Electrical Industries, Ltd., of Enfield, Middlesex, England, to lay out a final assembly line only a third the length of many conventional lines.

Circuit boards travel over a "solder wave" where a continuous flow of solder seals the connections. Solder adheres only where resist pattern is printed.

An electronic unit, 80′ in length, assembles the circuit boards used in the receivers. The unit is entirely automatic, assembling 900 boards an hour.

At the intake end the boards are automatically loaded on to guide rails which carry them beneath a line of 75 inserter heads. The heads are electronically controlled and operated by compressed air at 100 lb. sq. inch. The operation of both heads and guide rails is synchronized by a time cycle mechanism.

One type of board during its six-minute journey along the



Three rotors for disc tuners used in Ferguson TV receivers are range tested simultaneously. This eliminates loss of time during "warming-up."

rails is fitted with 69 components including resistors, terminal pins, valve holders, and jumper wires.

The components are fed to the inserter heads from bandolier drums, each holding 2500 components. The machine works to extremely fine tolerances and an error of .001 in dimension can cause an automatic stoppage.

Larger components—capacitors, transformers and valves—are fitted on a conventional belt assembly line. Here, components

Automatic printed circuit board assembly is done on this 80′ long line. Bandolier drums on inserter heads hold 2500 components.

are supplied from a continuous overhead chain of moving cradles suspended from a 900′ monorail.

In an automatic soldering process the boards travel over a "solder wave" where a continuous flow of solder seals the circuit connections. A solder resistant pattern printed on the underside of the board ensures that solder adheres only where required.

Completed sub-assemblies are passed on to testing stations on color-coded trays.

EFFICIENT PEN ASSEMBLY CLAIMED FOR MACHINE

Fountain pen tips and barrels are being assembled 2400 per hour with 85% increased production efficiency by a completely automatic assembly machine.

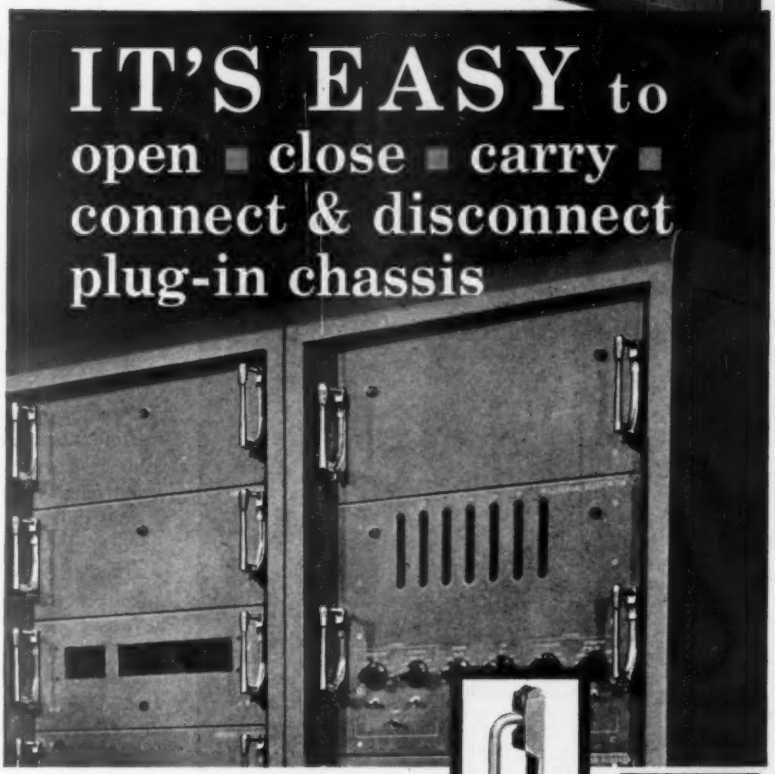
Components are fed to the Syntron machine by two electromagnetic vibratory bowl-type parts feeders.

Upon signal from the 12-station index table, a barrel is discharged from one gravity feed track at station one. It is in a vertical position, with pointed end up over a flaring anvil.

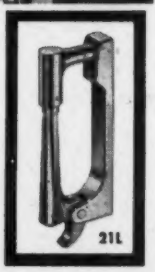
From station two a pen tip is flared inside the barrel. •

DATICO "digital automatic tape intelligence check out" is made by the Nortronics Div. of Northrop Corporation for the U. S. Air Force and U. S. Army Rocket & Guided Missile Agency. This money and man saving tool provides rapid weapon system evaluation. Note Camloc Chassis Latches.

IT'S EASY to
open ■ close ■ carry ■
connect & disconnect
plug-in chassis



with CAMLOC®
multi-function
CHASSIS LATCHES

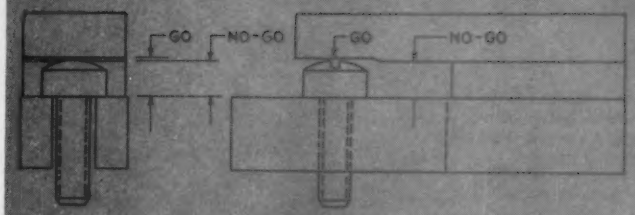


Thirty-eight strong, simple, attractive Camloc multi-function Chassis Latches are used on the 24 equipment filled plug-in chassis that make up DATICO, the military's new universal automatic field service checkout system. Here is a perfect example of designed-in fastener serviceability, flexibility, ease of handling and economy in interconnected "black-box" systems. When the Camloc push-button handles are released and pulled down, the chassis is automatically disconnected and ejected. Then the latch becomes a carrying handle. When replacing the equipment the latch firmly pulls the chassis back in place, making perfect, automatic reconnection of multiple-pin units. It is quick, safe, reliable, vibration-proof. Camloc Chassis Latches consist of only two parts—a handle and a fork—mounted with standard screws. Several handle and fork designs are currently available, all interchangeable. *Write for Camloc's new Bulletin 35L today.*

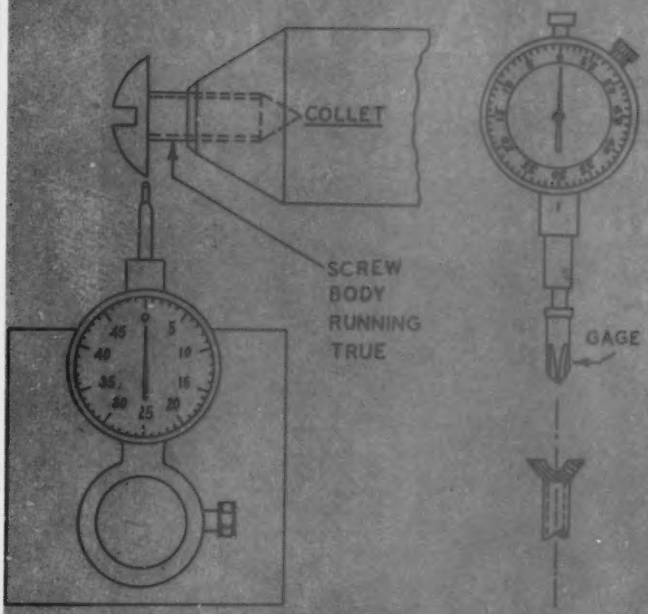
"Specialists in Fasteners for Industry"

CAMLOC FASTENER CORP. • 14 SPRING VALLEY RD., PARAMUS, N. J.
WEST COAST OFFICE: 5410 WILSHIRE BLVD., LOS ANGELES, CALIF. • SOUTH WEST OFFICE: 2508 W. BERRY ST., FORT WORTH, TEXAS

Use postpaid card. Circle No. 218



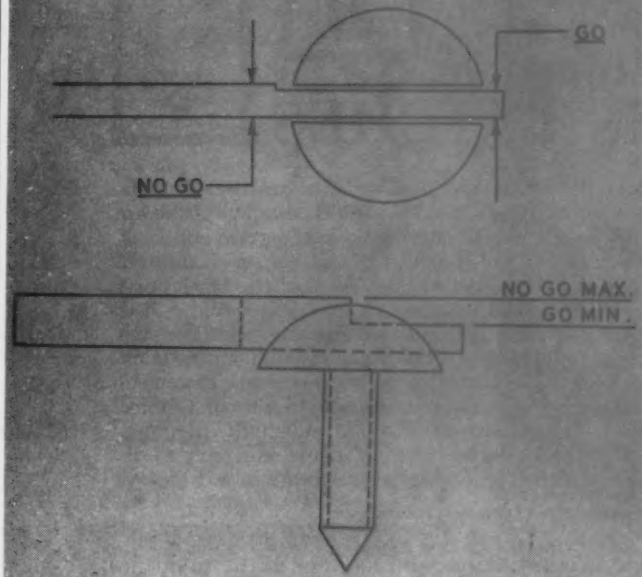
1. Head height can be measured with this two-step gage.



2. Fixture for measuring the eccentricity of the heads of self-tapping screws.

4. Checking depth of penetration of recess in head.

3. Width and depth of slot can be checked with this gage.



HOW GOOD ARE

Here's a guide for checking incoming batches of self-tapping screws, plus a few simple inspection devices

by **Louis Lovisek,** Manufacturing Manager
Parker-Kalon Division
General American Transportation Corp.

In order to assure that self-tapping screws are efficiently used on a high production assembly line, it is important to know the major qualifications of such screws.

Basically, there are five parts to a self-tapping screw: the head, thread, slot or driving recess, hardness and functionality of the screw itself. It is possible that all five features are not important to a particular assembly; however, at least one or more are definitely important. To determine which are most important, it would be necessary to make a detailed study of the equipment used to handle the screw, the method of driving, and the function of the screws in the assembly. One simple answer to this is to consistently use screws of uniform quality.

HEAD IS KEY TO AUTOMATIC DRIVING

In automatic driving, the screw head plays a most important part. The screw is usually guided or positioned by means of the head passing through a tube or being guided down rails. For this reason, the outside diameter of the head must be uniform. This diameter can be checked with a hand micrometer which can also be used to measure the head height. However, a special collar would have to be made to embrace the screws and be long enough so that the micrometer can bridge both the special collar and the head of the screw.

For faster measurement of head height, a special gage can be made. This gage is a two-step affair with a straddle section to straddle the body of the screw. The two steps are the "go" and "no-go" limits of the dimension. Figure 1 shows such a gage and how the screw can be inserted for inspection.

Concerning head eccentricity, the ASA B18.6.4 states: "Tapping screw heads shall not be eccentric with the screw bodies by more than 3% of the maximum head diameter."

This means that by gripping the body of a screw in a true running collet, the total indicated reading

THE SELF-TAPPING SCREWS YOU BUY

of the outside of the head cannot exceed 6% of the maximum head diameter. For example, the maximum head diameter of a No. 10 truss head is .448″; 3% of this is .013″, which means that the center of the head can be displaced from the center of the screw body by a .013″. This also means that the path of the rotating edge of the head can move .026″, or twice the center line displacement.

MEASURING ECCENTRICITY OF HEAD

Figure 2 shows a small fixture which can be used to measure the eccentricity of the head. Care must be taken in indicator readings, because unfilled sections and out-of-roundness will affect the total indicator reading. The head must be square with the body in order to get good bearing contact on the assembly.

On this subject the ASA states: "The bearing surface of perpendicular bearing surface type tapping screw heads shall be at right angles to the axis of the body within 2 degrees."

For clarity, we may consider the term "squareness with the body" as meaning "cocked head" or "head angle deflection." This condition can be determined easily by placing the screw in a suitable collar having a longitudinal hole of .002″ larger than the maximum diameter of the screw. By holding the assembly against the light, you can see whether any light is coming between the bottom of the head and the bearing surface of the collar. While this method is quick and effective, it is rather crude inasmuch as the angle of deflection cannot be determined.

Where accurate measurement is desirable, the test can be carried out in a true running collet. A dial indicator reading will tell the amount of deflection from the screw axis. By trigonometry, the angle of deflection can be calculated.

A still easier method to determine the amount of head angle deflection is to observe the screw under a microscope having lens calibrated in the form of a protractor in which case a direct reading is obtained. Care must be taken to rotate the screw 360° to determine the maximum amount of deflection. A visual inspection of the head is usually desirable and indicative of the care taken in manufacture.

CHECKING WIDTH AND DEPTH OF SLOT

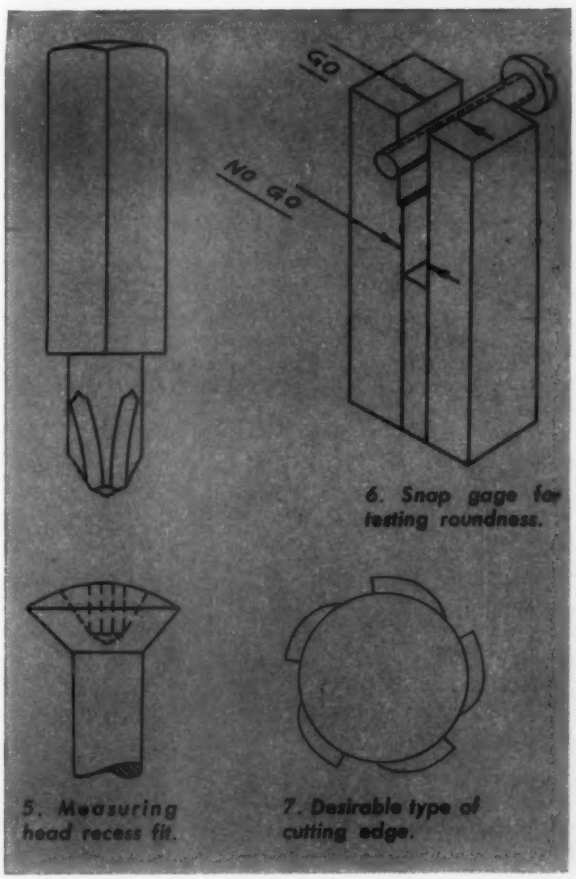
In automation, if the screw is not driven into the assembly, costs can sky-rocket. The assembly line usually stops and the screw must be removed and another screw properly driven before the line can be started again. This means down-time and added expense of operation. In some cases, the screw may not be driven home because of poorly formed slots or poorly formed recesses in the head of the screw.

To avoid down-time or camming-out of the screwdriver from a slot, the slot should be closely examined. Width of the slot can be checked with feeler gages or a special "go" and "no-go" gage. Depth can also be checked with this gage (Figure 3).

The slot should be centralized. Otherwise, in confined spaces the slot could cause misalignment with the driver and prevent proper driving. The lower contour of the slot should be smooth, without loose-hanging burrs or an over-burr condition on the slot. Loose-hanging burrs can break off and cause jamming, while the over-burr slots can prevent proper engagement with the driver.

Poorly formed recessed head screws could cause camming-out of the driver, which would also shut down an automated line. These recesses can be checked for depth of penetration with a special gage (Figure 4). Recess fit is measured with a gage shown in Figure 5. A poor recess fit on the driver or a shallow depth of engagement on a driver will cause camming out.

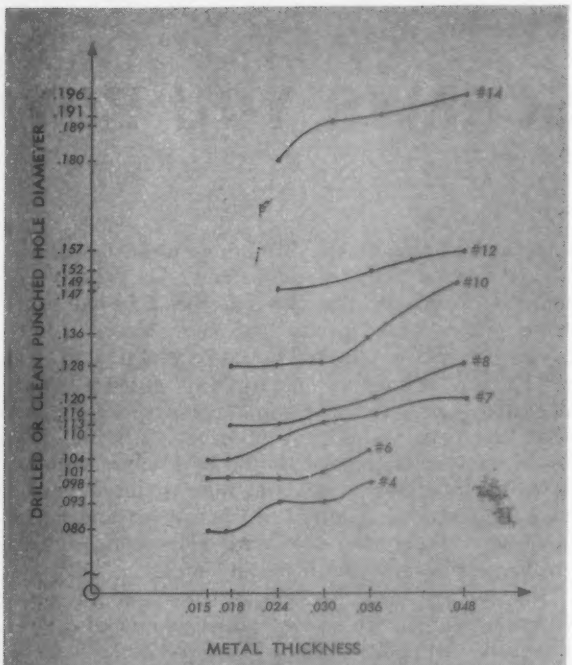
continued



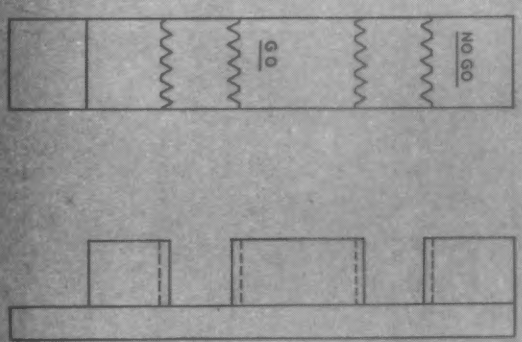
6. Snap gage for testing roundness.

5. Measuring head recess fit.

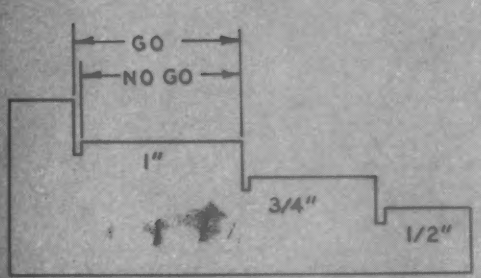
7. Desirable type of cutting edge.



8. Recommended hole size vs. metal thickness for Type A self-tapping screws used in thin gage metal.



9. The root diameter can be checked with a pointed anvil micrometer or a fixed "go" and "no go" gage.



10 This simple type of gage can be used for rapid inexpensive lot checking of screw length.

Check List for Tapping Screws, continued

Automatic driving of screws requires predetermined tightening torques. The drivers should be equipped with a slip clutch or some other torque-limiting device. The screw must be driven and properly tightened to serve its most efficient holding power. If overdriven, either the threads fail or the material fails. This results in inefficient fastening or a loose fastening.

DRIVING VS. TIGHTENING TORQUE

In either forming or cutting its own thread, the tapping screw requires power which is called "driving torque." This torque must be well below the tightening torque. If it is equal to the tightening torque the screw will not hold the assembly securely; if the driving torque is greater than the tightening torque set on the driver, the screw would never drive home. A partially-driven screw can jam up the assembly mechanism and cause more expensive down-time.

The driving torque of a tapping screw is dependent upon the thread and its formation. The outside diameter of the thread is a function of the driving torque. If this is oversize, the driving torque will be greatly increased. If it is undersize, the efficiency of the fastening would be dangerously low. The outside diameter can be measured with any ordinary hand micrometer.

CHECKING FOR OUT-OF-ROUNDNESS

Care must be taken to rotate the screw between the anvils of the micrometer, with readings taken to check "out-of-roundness." Out-of-round threads will produce erratic driving torques. For incoming inspection of the fasteners, it is recommended that snap gages be used (Figure 6). Because the maximum and minimum limits of the thread diameter are permanently fixed, rapid inspection of this important part of the screw can be made.

Other thread functions of the driving torque are lead thread development and definition of cutting edges at the start of the thread. These are generally the culprits when high driving torques are experienced. A poorly-formed lead thread on a machine screw could cause a mis-matching of the screw thread with the threads in the tapped hole. Such mis-matching will cause driver stoppage, because the build-up torque exceeds the driving torque of the driver.

If the tapped hole is in comparatively soft material, the build-up of torque will not be so severe and the screw will tend to form its own thread in the material, making a very inefficient fastening. Incoming inspection should check for well-defined thread forms gradually tapering off to the root diameter at the point. This tapering off should be uniform over two revolutions of the thread. In thread forming screws this gradual tapering off should extend over two pitches of thread. The thread should taper from a single crest to a double crest.

The true thread should have the same height at any one point.

In the case of the thread cutting screws the definition of the cutting edges or edge is most important. These edges should be sharp to present a right angle cutting face or hook to provide a rake on the cutting face (Figure 7).

The cutting edges should be backed up by well formed threads, and should extend from the end of the thread to or beyond the full diameter of the screw. If the point of the screw is threaded to the end, such as demonstrated by the Type "A" screw, care should be taken at incoming inspection for visual examination. If the part is to be used for self-drilling in steel or wood, the spiral of the thread should extend to the very end of the point, which should be well formed, clean, and free of cavities. If the point is to be used for misalignment purposes, it is not necessary to have this full thread all the way to the end.

CONSIDERATION FOR ROOT DIAMETER

Other thread functions of the driving torque of tapping screws are root diameter and thread formation. In thin gauge applications the recommended hole sizes (Figure 8) are rather close to the root diameter of the screw in order to obtain the most efficient fastening. If the root diameter of the screw is too large, it will rub in the hole and result in higher driving torque. If the root diameter is below standard, a weak screw results. Incoming inspection can check this important feature with a pointed anvil micrometer or a fixed "go" or "no-go" gauge. (Figure 9)

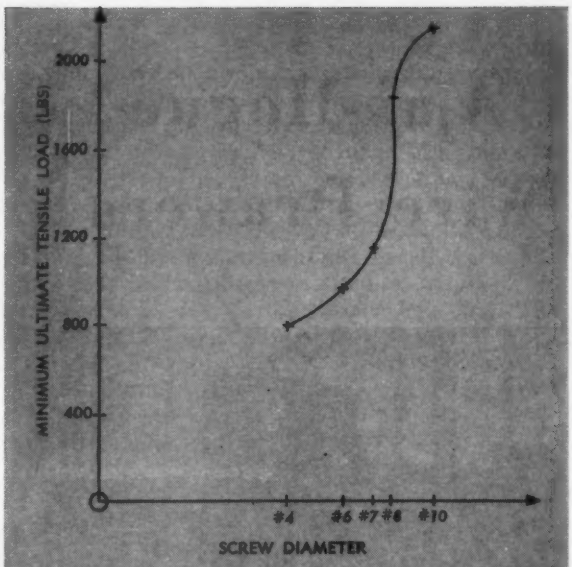
Once the leading part of a tapping screw is driven into the material, the driving torque usually remains constant until the head of the screw makes contact with the assembly. If the threads are rough, flaky, wavy or contain imbedded chips, the driving torque will continue to rise. It may even rise to the tightening torque and leave a partially-driven screw in the assembly.

Imbedded chips, rough thread, or flakes will act like tiny files and create friction as they move. A wavy thread means that one part of the thread will not follow exactly in the path created by the starting or leading thread. This interference tracking results in friction and higher driving torques. A visual examination of thread condition is recommended plus a function test which will be described later.

FOLLOW ASA STANDARDS ON TOLERANCE

In designing an assembly it is sometimes necessary to limit the length of the screw because of blind holes or interfering parts. First, consider the length tolerances, as defined in the ASA standards, and be aware that the tolerance varies with the length and type of screw. If the screw used is longer than standard it could bottom in the hole and provide an inefficient fastening; or it could cause interference and result in malfunctioning of the assembly. If the screw is shorter than standard, it could result

continued



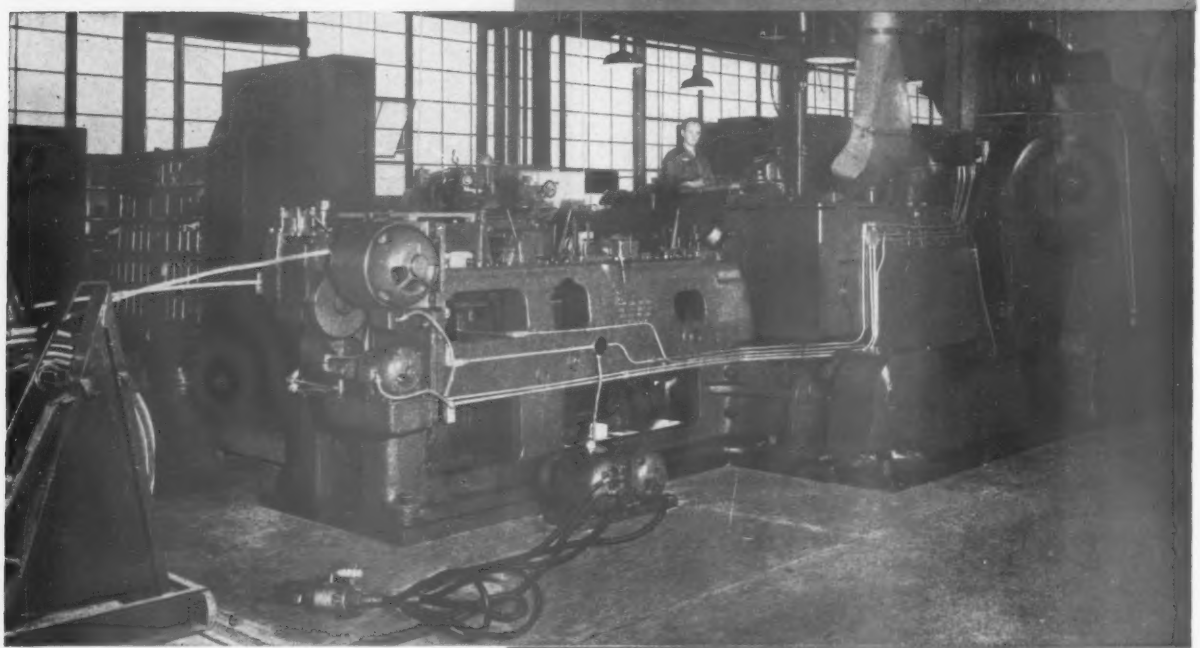
11. Minimum ultimate tensile load vs. the diameter of five sizes of Type A self-tapping screws.

12. Driving, strip and recommended tightening torque for Type A tapping screws used in thin gage metal.

Metal Thickness	Driving Torque	Strip Torque	Tightening Torque
	No. 4 "A"		
0.015	0.967	2.827	1.73
0.018	1.084	4.550	3.00
0.024	1.417	6.000	3.75
0.030	2.124	7.447	3.75
0.036	2.399	10.088	4.125
	No. 6 "A"		
0.018	1.925	7.750	4.50
0.024	2.615	11.955	4.50
0.030	4.540	16.125	8.25
0.036	5.015	20.200	9.75
	No. 7 "A"		
0.018	2.615	17.667	6.75
0.024	3.164	13.317	6.75
0.030	4.417	21.000	13.5
0.036	7.083	24.333	16.1
0.048	7.850	30.600	18.0
	No. 8 "A"		
0.018	2.090	9.680	4.50
0.024	4.070	20.300	10.0
0.030	6.420	26.420	11.5
0.036	6.610	27.400	13.5
0.048	9.600	33.700	20.5
	No. 10 "A"		
0.018	3.170	15.950	9.0
0.024	5.300	20.700	9.75
0.030	8.800	29.200	15.38
0.036	8.260	34.750	15.38
0.048	10.930	45.600	18.75
	No. 12 "A"		
0.024	7.500	28.333	19.5
0.030	10.000	42.000	26.25
0.036	11.333	50.667	35.25
0.048	17.333	62.667	42.7
	No. 14 "A"		
0.024	6.167	26.833	17.25
0.030	9.500	37.167	22.9
0.036	13.460	50.500	22.5
0.048	18.933	78.300	38.5

Ajax-Hogue Wire Drawers

Built in Eight Sizes *for* All Cold Headers



Courtesy of Lake Erie Screw Corp., Cleveland, Ohio

AJAX-HOGUE WIRE DRAWERS Can be attached to any make Cold Heading Machine with which we are familiar.

It is a complete Wire Drawing unit driven from the header by roller chain. Built in eight sizes, it can handle all diameters of rod from the smallest available size rod up to a maximum of 1½" diameter.

LOWER MATERIAL COSTS
IMPROVED PRODUCTS
LONGER DIE LIFE
CLOSER WIRE TOLERANCES
STRAIGHT WIRE BLANKS

• *Write for Bulletin No. 111-A* •

THE **Ajax** MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND 17, OHIO
110 S. DEARBORN ST., CHICAGO 3, ILLINOIS
W. P. WOOLDRIDGE CO. • BURLINGAME, CAL. • LOS ANGELES 22, CAL.

Use postpaid card. Circle No. 219

in reduced holding power and inefficient fastening.

The length of the screw could be checked with a scale. For incoming inspection, a gauge (Figure 10) can be used for rapid inexpensive lot checking.

Even though tapping screws check out dimensionally perfect, there are other matters to consider. If the screws are too soft they will not drive. If they are too hard they will break. It is also possible that the slots or recesses will break out during driving and detract from the general appearance of the final product.

A good tapping screw should take a 15 degree sharp cornered bend without breaking. Under impact, the head should deform slightly without chipping at the edges.

The thread should be hard but not brittle. A combination of the chemical composition of the material in the screw, the core hardness, the case hardness, and the depth of case, determine the functional ability of the screw.

CHECKING FOR PERFORMANCE VALUES

Since the important task is that the screw perform satisfactorily with necessary strength, a series of tests have been developed to check this. For performance values there is a driving torque and a stripping torque test. For strength values there is a tension and an ultimate torque test. The driving and stripping torque tests can be made in a Detroit or a Sturtevant machine.

Here is how it is done. A specimen of the material is prepared with the proper hole size, and a tapping screw driven into it. Observation is made of the torque needed for driving the leading section of the screw into the material. Rotation is continued until there is a failure in the fastenings. Either the screw breaks or the material fails. Figure 12 shows the maximum driving torques and minimum stripping torques obtainable from good tapping screws.

The torsional strength of the screw can be checked on any standard tensile machine. The material should be pre-tapped to obtain maximum strength of the threaded engagement so that the failure would be in the root of the screw. This will yield the ultimate tensile strength of the screw. If the tensile strength of the fastening is desired, a sample of the materials is used with the proper hole size. The screw is then driven into the material to fasten together two "U" sections of the tensile apparatus. Figure 11 shows the minimum ultimate screw strength for good tapping screws. Figure 13 shows typical fastening tensile strengths.

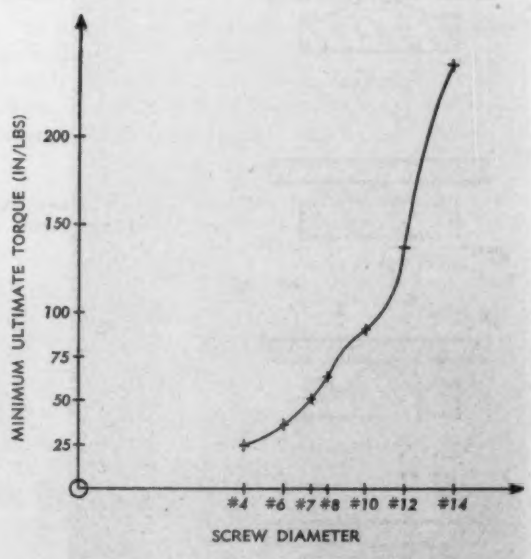
TESTING ULTIMATE TORQUE STRENGTH

The ultimate torque strength of the screw can also be obtained on a Detroit or a Sturtevant machine. A specimen of the material is prepared with a hole size about 75 percent of the recommended hole size. The screw, with two loose washers under the head, is driven into the material until failure occurs in the root of the thread. The rupture torque is recorded. Figure 14 shows the minimum torque strength of good tapping screws.

In automating an assembly line, one can never devote too much attention to the screw fastener to be used. In calculating the savings resulting from automation, the cost of each component plus the assembly, develop unit cost. Since there is a danger in inefficient operation of the line due to problems of screw driving, cost should be calculated by adding the cost of using the screw to the cost of assembly. If reliable screws are used the cost of assembly should be low. •

Screen Diameter: (gage no.)	Metal Thickness: (inches)	Ultimate Tension Load (pounds)
4	0.018	88
4	0.024	165
4	0.036	232
6	0.018	202
6	0.024	280
6	0.036	462
7	0.018	247
7	0.036	537
7	0.048	700
8	0.018	240
8	0.036	650
8	0.048	830
10	0.018	150
10	0.036	480
10	0.048	840
12	0.024	348
12	0.036	708
12	0.048	1103
14	0.024	607
14	0.036	938
14	0.048	1153

13. Tensile strength of typical sheet steel fastenings utilizing Type A self-tapping screws.



14. Minimum ultimate torque vs. the diameter of seven sizes of hardened Type A self-tapping screws.

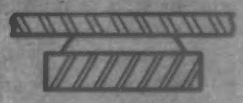
THE DESIGN AND APPLICATION OF

Part 1

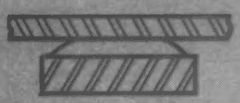
This first of two articles tells how weld fasteners can aid product design as well as simplify certain assembly operations. The second article, to appear in August, will be concerned with welding techniques.

by **Ray H. Smith,** Associate Editor

TYPES OF PROJECTIONS

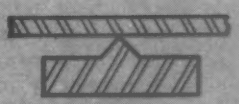


Rib

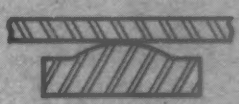


Rib (tapered)

Bevel

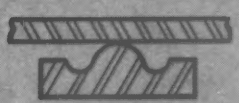


Cone

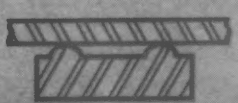


Spherical

Spherical (multiple)



Spherical (recessed)



Annular

The J. P. Seeberg Co., Chicago, manufacturer of coin-operated phonographs, claims not a single service call resulting from failure of a resistance welded pin supporting 53 pounds of electronic equipment. This represents a 600% reliability improvement over the previous fastening method abandoned almost two years ago.

Vending machine makers like Bert Mills feel that weld fasteners are ideal for tamper-proofing units. Sub-assemblies can be mounted on hardware either completely inside the unit or permanently affixed, flush with outside panels (Figure 1). Chief engineer John Dyson says the fasteners have speeded assembly 15% by allowing 30 fasteners on each coffee dispensing machine to be pre-attached under subcontract. One man, instead of the usual two, can complete the assembly.

"These weld fasteners have taken the place of a 'third hand' for our service men who would otherwise have to reach into hard-to-get-at places in dismantling sub-assemblies for cleaning," points out Dyson.

In fabricating sink counters and range inserts, St. Charles (Ill.) Kitchens has found "hidden" projection weld screws the answer to permanent fastening without breaking clean exterior surfaces (Figure 2).

A contract shop, Central Sheet Metal, of Chicago, now stocks a half-million welding parts and has template settings made to cover most typical operations. "We've used thousands of these piloted nuts over the past eight years with never a rejection from misalignment," reports Morton Bogin, vice president.

Jackson Auto Radiator, Chicago, was able to switch its method of fabricating oil burner housings from casting to stamping since weld nuts eliminated the need for tapping drilled holes.

And these applications, chosen at random, are characterized by two facts: in each instance there

WELD FASTENERS

was once another way of doing the job and in each instance someone had the foresight to see that a few more pennies spent on fasteners and still more dollars invested in welding equipment would multiply savings at the point of assembly.

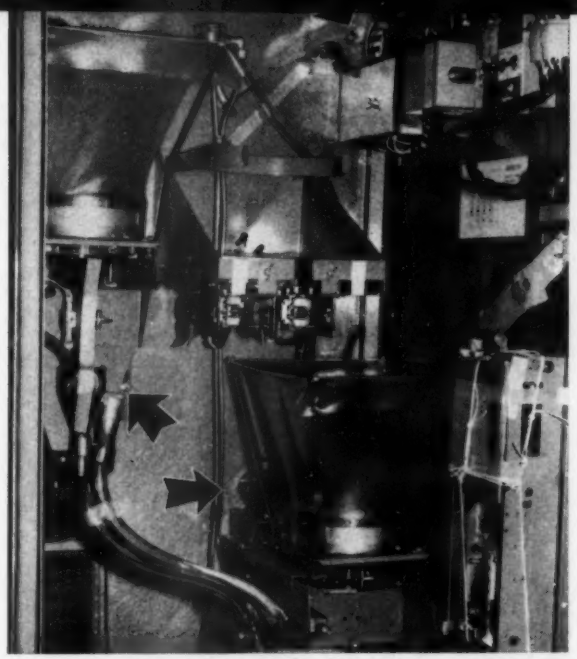
This hammers home industry's position today. Products are increasingly complex. Labor and materials costs are rising. The dollar is worth less and less. Is it then any wonder that a fastening method able to solve specific assembly bottlenecks while saving money should triple in use since 1946?

FORD STARTED IT 30 YEARS AGO

Not that the concept of parts being resistance welded to sheet metal is new. It isn't. Thirty years ago Ford Motor Company acted on its idea of a fastener which could be pre-attached to stampings before reaching the assembly line. Developed further by The Ohio Nut & Bolt Co. in conjunction with The Budd Company of Philadelphia, a screw with three tiny bosses on the under side of its head was designed to be projection welded to fenders mounted to Model-A frames.

A 500-million parts-per-year business, led by the automotive and appliance industries but spreading into electronics, farm implements and elsewhere, has mushroomed from that first application. Figures 3 and 4 show more interesting examples of current applications.

Accomplishments like Ford's are the result of sound thinking plus hard work. It is just as obvious that design opportunities present in welding fasteners are far from exhausted. But there is no shortcut around one prerequisite—a basic knowledge of the types and functions of these fasteners (and there are more than 40 variations), and an understanding of the welding processes which position them.



1. Arrows point to three of several dozen weld fasteners in Bert Mills coffee vending machine. Unit is tamper-proof and easily serviced through use of weld fasteners.

Weld fasteners are cold-headed parts designed to be fused permanently in place by either projection or spot welding. These resistance welding methods are basically the same. In projection welding, heat is localized through embossments, tabs and buttons to melt these protrusions and form individual welds. In spot welding, current is directed through all the area under the electrode tip.

Nuts, screw and pins are available in both projection and spot weld types (Figures 5 and 6). Bolts, brackets, pads, knobs, handles and clips are presently limited as standards to projection welding (Figure 7).

GREAT IMPETUS DURING PAST DECADE

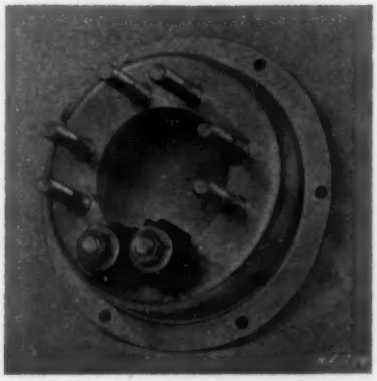
It was the development of spot welded fasteners, as well as new projection designs, some 10 years ago which increased interest in this joining method. Now designers could choose the more suitable of several types of fasteners for an application. Often

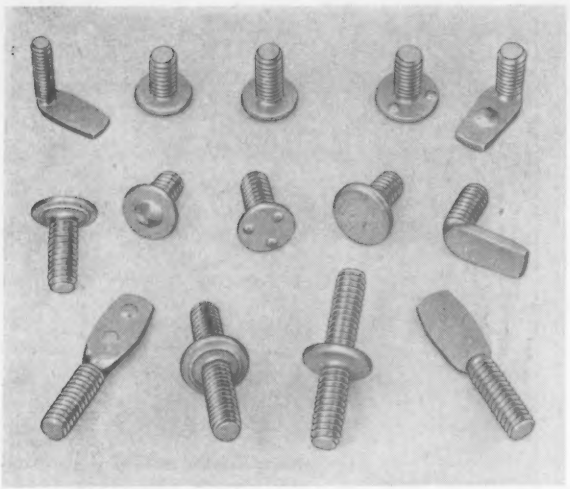
continued

2. Use of copper adapter lets St. Charles Kitchens weld variety of screws without changing electrode.

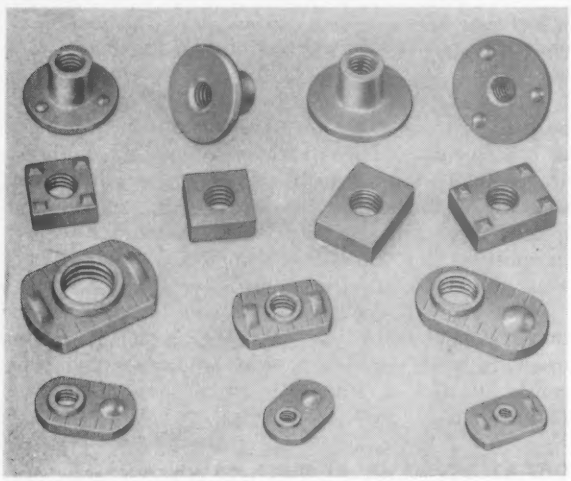
3. A 2-projection nut welded to stamped parts makes sturdy bracket for bicycle headlight.

4. Eight 3-projection weld screws are welded on gear mechanism prior to mounting of other components.



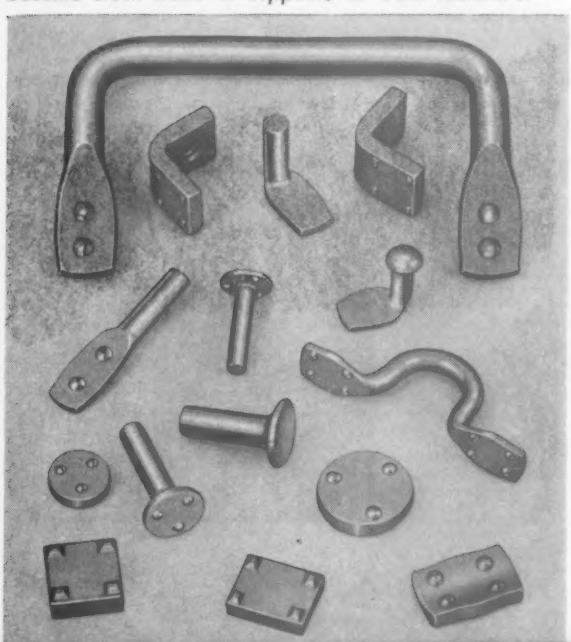


5. Here are some typical weld screws. The first weld fastener, developed for Ford Motor Company, resembled the screw in the top row, second from right.



6. Projection weld nuts are available in internal and external types, and in a variety of projection designs.

7. Many one-time special parts such as these have now become stock items of suppliers of weld fasteners.



parts could be spotwelded at the same time and on the same machines that sheet metal assemblies were being welded. Production was speeded by eliminating extra setup time for electrode changes.

An example of this new flexibility is seen at Jackson Auto Radiator. At one time three-projection hex nuts were used to mount the transformer, motor and pump to an oil burner housing (Figure 8). Then flat, one-button projection weld nuts were introduced. Trials showed that the weld fastener's lower silhouette permitted the use of a larger blower wheel within the housing, increasing the air capacity of the burner. At the same time the smaller fastener cost 5% less, a substantial saving when 250,000 are used each year.

FOUR FACTORS TO CONSIDER

In determining whether weld fasteners can be used on a specific job, there are four major factors to be considered.

1. Are the materials suitable for resistance welding?
2. Is the work so designed and of the size to be carried to the welding machine?
3. Will the production output justify tooling costs and the change in assembly methods?
4. If the proper equipment is not already available, is the capital investment warranted?

Not all metals are suitable for resistance welding. Since low carbon steel offers the greatest resistance to electrical current, stock parts are exclusively made from 1010 steel with a maximum of 10 to 20% carbon content.

A typical schedule of the physical properties of mild steel parts is:

Tensile strength—60,000 psi
Yield point—30,000 psi
Shearing strength—30,000 psi
Elongation (2″)—30% maximum

In spite of high carbon steel's strength, it offers too many welding complications to be economical for mass production.

The difficulty lies in the characteristically rapid cooling rate of these steels when spot or projection welded. Resulting welds are 100% harder than surrounding metal and extremely brittle. And while this brittle structure is high in shear strength, it is low in resistance to stresses more normal to welds and often breaks apart.

Steels with more than 20% carbon content are also more sensitive to weld time and current values than low carbon steels. This makes them more subject to problems of "flashing" and indentation.

If steels such as No. 1035 and 1045 must be used, the welding operation will require reducing the cooling rate with post-heat cycles (a tempering time cycle). This control is not usually found on standard projection welders.

In the final analysis, it is often better to choose a different metal and to increase the diameter or cross-sectional area of the product or fastener to obtain desired strength.

Stainless steel parts are often specified to produce an all-stainless end product. Higher raw material costs are partially balanced by the fact that the fastener does not require plating. And while welding stainless fasteners is a more critical operation, the material's high tensile strength often leads to economies by permitting use of lighter gage metal. Physical properties of stainless steel parts might be:

Tensile strength—75,000 psi
Yield point—35,000 psi
Shearing strength—30,000 psi
Elongation—(2″) 55% mamixum

Best welds are obtained when fasteners are furnished in a bright finish: a clean surface without scale or plating. Should an assembly be too large or complex to plate after welding, zinc, cadmium and nickel platings will not materially affect the welding operation. Weld time should be kept short to minimize discoloration.

Parkerized or bonderized finishes are poor electrical conductors and should not be applied until after the parts have been welded. Annealed products should be pickled to remove scale or oxides. This applies to both parts and sheet finish. Hot rolled steel, for example, should always be pickled before welding.

In addition to low carbon steel, other materials well suited for welding are high brass, Everdeur, Monel and stainless steel (18-8, type 302). While aluminum can be successfully spotwelded, projections will break down under heat and pressure on this metal. Unleaded brass can be welded by using current values over 20,000 secondary amperes and a maximum of six cycles weld time. Copper is impractical because of its softness and low electrical resistance.

8. A 4-button nut is welded to stamped oil burner housing at Jackson Auto Radiator. The nut's lower silhouette permits use of a larger blower wheel in the housing.

An estimated 90% of weld fasteners are used with stamping-type gauges of metal. G. F. Grey, chief engineer at Ohio Nut & Bolt, places this range at from .030″ to .125″. Several factors contribute to this limitation.

Most welding equipment is stationary since experience has shown that for high-production runs a fixed setup is most favorable. This would require work capable of being transported to the machines

continued

9. This battery of press-type welders is used at S&Z Tool & Die to weld screws to small stampings at the rate of 700 per hour. The weld screws and stampings form adjustable feet as strong as solid pre-formed parts.

OHIO WELD NUTS

AS THE PRIMARY FASTENERS IN FASTENER ASSEMBLIES MEAN . . .

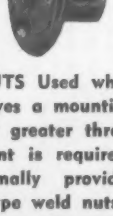
- ▶ LIGHTNING-FAST APPLICATION BY RESISTANCE WELDING
- ▶ PRIMARY FASTENER PERMANENTLY POSITIONED—NO RETAPPING NECESSARY
- ▶ SPLIT-SECOND ASSEMBLY OF PRODUCT COMPONENTS—MADE POSSIBLE BY PRE-ATTACHED PRIMARY FASTENER

XN NUT with precision pilot and recessed target electrode area. Provides optimum weld even with light spot-welding equipment.

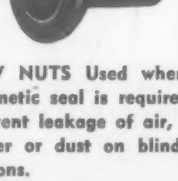
WS NUT For applications on rugged assemblies where it is necessary to anchor nut securely in blind location.

PN NUT Used where a pilot for easy locating, a strong weld and space limitations are important factors. Ideal for use in confined corners, flanges and narrow channels.

RH NUTS Used where it is desirable to have the body of the nut go through the sheet or where extra long thread engagement is needed.

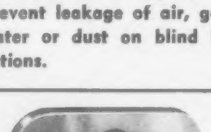


WF NUTS Used where the nut serves a mounting purpose or greater thread engagement is required than is normally provided by other type weld nuts.



WW NUTS Used where a hermetic seal is required to prevent leakage of air, gas, water or dust on blind locations.

RN NUT with pilot and dual-line projections. Ideal in applications where tension is against the weld.



ND NUT Used where a large nut is needed for bridging or joining two sheets or for extra strength.

Samples and information available upon request.

The OHIO WELD FASTENERS Primary Fastener in Fastener Assemblies

THE OHIO NUT AND BOLT CO.

30 FIRST STREET BEREA, OHIO

Use postpaid card. Circle No. 220

and designed to fit between the electrodes. However, portable operations are feasible though rare. Lennox Mfg. Co., in Chicago, uses gun welders to spot weld fasteners in the assembly of automatic coffee dispensing machines.

There is no question that fasteners can be welded to heavy plate providing the welding machine has the capacity, and setup requirements are satisfied. Welding to plate up to ⅝" thick is being done successfully in the farm implement field.

But the point, observes Grey, is that weld fasteners maximize their usefulness when they can eliminate the need for heavy plate. This, naturally, depends on the type of end product. But since majority demand is here, the bulk of engineering and manufacturing emphasis has been devoted to meeting this need.

Grey points out that heavy plate was once necessary in order to have enough metal for tapping, or when arc-welding a nut in place to prevent burn-through. Users can now switch to lighter gauges, and by using weld nuts suffer no reduction in thread engagement. In addition, welding is said to metallurgically strengthen the area around the hole in the sheet.

Can assembly needs be met with standard weld parts? Or must specials be designed? These are key cost considerations and it is sound policy to consult the supplier in the product design stage. There are over 500 stock sizes in the industry, plus unnumbered specials already blueprinted.

Standard weld fasteners are generally sold in minimum lots of 1000. The rule-of-thumb for economically producing a special is a 10,000 minimum order. Although a few stainless steel nuts and screws are stock parts, most stainless orders should be between 20,000 and 30,000 or larger thread sizes and 100,000 on small sizes such as 6-32 and 8-32.

Most manufacturers offer stock samples for experiments or pilot-model production runs.

A single-phase, press-type resistance welding machine is required for projection welding (Figure 9). Either the press type or rocker arm machines is suitable for spot welding fasteners. Most weld fasteners are being applied with machines having transformer ratings in the 20 to 100 kva sizes. Ring-type projections for hermetically-sealed welds are the exception and require capacities up to 250 kva.

The popular 75 kva model has a wide range of capacity and the advantage of being efficient on small (10-15 kva) jobs. Smaller machines are limited only by their capacity.

Once these factors have been considered, it becomes proper to study the application more closely in the light of specific fasteners and welding technique.

Projection welding offers several distinct advantages. Parts are easily welded in an assembly fixture. Multiple welding is practical, especially when welding to irregular sections. Weld indentation and discoloration are negligible. Less current and pressure

are required than other methods. Larger bearing surfaces prolong electrode life. Heat balance is easier to obtain for welding difficult combinations. Finally, it is the only way some parts can be resistance welded.

Location of projections determines fastener use. When projections are on top of the screw head, the part will be welded head down to the work. This fastener eliminates drilled holes, thereby offering clean outside surfaces. No electrode insulation is needed.

Projections are placed under the head if the body of the part is to pass through a hole in the sheet metal. This self-locating design provides a flush surface for mating parts and gives an extra thickness of metal for tensile strength.

In both instances the part is permanently positioned. If threaded, as a screw, the torquing of mating nuts either manually or with power tools requires no holding of the welded fastener.

Properly designed projections result in finished welds stronger in tension, shear or torsion than the body diameter of the fastener. It is important to note that the projections discussed here are the upset or coined projections found on weld fasteners. Another type, embossed projections, is formed by a die cavity punching process.

Multiple projections should be uniform in height and volume of metal. The "milk stool" principle—three projections equally spaced and located at the greatest possible distance from the center of the part—is recommended for all fasteners to be used on metal between .030″ and .125″ thick. This insures equal electrical contact on each projection and takes advantage of the maximum leverage in developing torsional strength of the weld.

Weld screws with three projections always bear even on a surface and make cleaner, more spatter-free welds.

There are different opinions on the design of fasteners to be welded to thin metals. One manufacturer of weld fasteners never specifies more than three projections. When sheet thicknesses fall below .030″ the proposed design would be either a ring projection to cover greater weld area or a specially-made fastener wth a larger diameter head or flange with projections moved out farther towards the edge than standard. Projections would be larger in diameter and shallower than usual.

Another firm holds that it is possible to improve the quality of welds and cover more weld area by adding more than three projections when welding to metals below .020″ thick. As the work becomes thinner, both the diameter of the fastener and size of the projections should be smaller.

It is for the reader to decide which design best suits his requirements.

In any event, it is recognized that the greater the number of projections, the more difficult it becomes to assure uniform contact through all projections. Great care is required in controlling the welding.

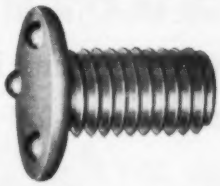
There are other criteria in specifying projections. Never should the height of the projection be greater

continued

OHIO WELD SCREWS

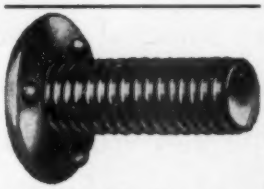
AS THE PRIMARY FASTENERS IN FASTENER ASSEMBLIES MEAN . . .

- **LIGHTNING-FAST APPLICATION BY RESISTANCE WELDING**
- **PRIMARY FASTENER PERMANENTLY POSITIONED**
- **SPLIT-SECOND ASSEMBLY OF PRODUCT COMPONENTS—MADE POSSIBLE BY PRE-ATTACHED PRIMARY FASTENER**



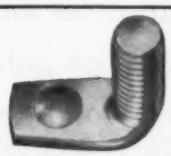
GW SCREWS — Used where design requires a smooth unmarred surface and a fastener permanently fixed in place.

HH SCREWS—Used where a single, button-type projection is required when welding to curved surfaces, to heavy sheet 1/4" or thicker, or to ends of rods.



HW SCREWS—Used where a self-locking through bolt is required to be fixed securely in place so that it will not turn and flush surface is required for attaching mating parts.

RW SCREWS—Used where a hermetic seal is required to prevent leakage of air, gas water, oil or dust, or when welding to perforated metal or wires.



DW SCREWS—Used where a projection weld screw is required and confined location necessitates a narrow head.

SS SCREWS—Used where a screw with narrow head is required to be spot welded in place.

PD SCREWS—Used where it is desirable to place a threaded section on the edge of a sheet.

CS SCREWS—Used where a hermetic seal and a screw are needed on both sides of the sheet as on transformer can relay points.

Samples and information available upon request.

The OHIO "WELD FASTENERS" Primary Fastener in Fastener Assemblies

THE OHIO NUT AND BOLT CO.

30 FIRST STREET BEREA, OHIO

Use postpaid card. Circle No. 221

How to LOCK-UNLOCK-RELOCK the same screw in Steel without Lock Wiring or Lock Nuts

The ***Heli-Coil***® Screw-Lock Insert* is the only insert made of wire which has an exclusive resilient internal locking feature that permits repeated assembly and disassembly of the same screw This patented insert insures minimum screw wear and maximum locking torque value—it meets military specs for locking torque and vibration through 550°F.

Made of stainless steel wire, the Screw-Lock Insert protects tapped threads permanently and is not affected by acids, solvents or high temperatures You can eliminate lock nuts, lock wiring and other clumsy external locking devices The locking coil will never relax its grip even in tough metals such as meehanite, stellite, titanium, etc. The insert can be used in blind or through-holes and its frictionless stainless steel finish will not gall or seize—even under the most adverse conditions Find out about ***Heli-Coil*** Screw-Lock Inserts and get your free copy of the new data guide to drilling and tapping in *steel* Mail the coupon today.

*Patented

HELI-COIL CORPORATION
DANBURY, CONNECTICUT

HELI-COIL CORPORATION, 3107 Shelter Rock Lane, Danbury, Connecticut
Please send my free copy of the new *Heli-Coil* DATA GUIDE TO DRILLING AND TAPPING IN STEEL, and information on *Heli-Coil* Screw-Lock Inserts.

NAME_____ TITLE_____
FIRM_____
ADDRESS_____
CITY_____ ZONE____ STATE_____ 1010

IN CANADA: W. R. WATKINS CO., Ltd., 41 Kipling Ave., S., Toronto 18, Ont.

Use postpaid card. Circle No. 222

than the thickness of the sheet to which the fastener will be welded. Best results come from 50 to 70% of the sheet thickness. When welding to stock over .125" thick, the height of the projection should be held to the low side of permissible working range.

The diameter or area of the projection is determined by the required strength of the weld. The total area at the base of the projection should be equal to or slightly greater than the area of the weakest section of the fastener. Tensile strength for the welded joint can be reckoned identical with the parent metal.

What are the basic types of projections and when should they be used?

Multiple spherical. Most widely used design, employing the "milk stool" principle for uniform contact, best welds. Recommended for sheet metal .030" to .125".

Spherical (button). Used most often in welding to heavy sections, forgings over .125" thick, and curved surfaces such as tubing. With the recessed spherical types, a cavity encircles the projection, allowing metal in plastic state to overflow into this relief. This allows complete setdown.

Rib-type. Forms strong welds to plate over 3/16" thick. Fastener has a heavy section where projections are located.

Cone. Used on sheets ranging from 12 gauge (.1093") to 5 gauge (.218"). Used in same type of applications as rib type.

Bevel. Designed for gas or watertight welds. Tapered projection is self-locating. Fastener requires high welding pressure and current.

Annular. Also made for sealed welds. Requires press-type welder.

When projections are flattened during welding, there is often a space of a few thousandths of an inch between the fastener and the sheet. In some instances where this might be objectionable, it is possible to either use a fastener with "guards" around the screw head to contain the metal, or to provide some recess adjacent to the projection for excess flow. •

WESTERN CONTROL CORP.

achieves three-way control with

KEYSTONE WIRE

At their modern plant in Wichita, Kansas, Western Control Corporation produces flexible controls that are specified for many applications from lawnmowers to giant excavators. This wide range is the result of closely controlled quality and cost at Western Control. Western has successfully used Keystone MB Spring Wire since its inception in 1946. Here are some reasons they give:

CONTROL OF PRODUCTION — Keystone metallurgists worked with Western and developed a special quality of drawn galvanized spring wire for high speed coiling. Constant uniformity of MB Spring Wire means long production runs — increased productivity of machinery.

CONTROL OF QUALITY — Company officials report, "Uniformity of temper and size of Keystone MB Spring Wire gives us close inside and outside diameter tolerances. Coating, too, is superior — no flaking or stripping in the manufacturing process."

CONTROL OF COSTS — Keystone furnishes drawn galvanized MB Spring Wire to Western in pay-off packs. This means less waste — less set up time — less handling time — and cleaner wire. To Western, this means a quality product at a competitive price.

Could you benefit from our experience in solving difficult wire problems? Talk it over with your Keystone Wire Representative.

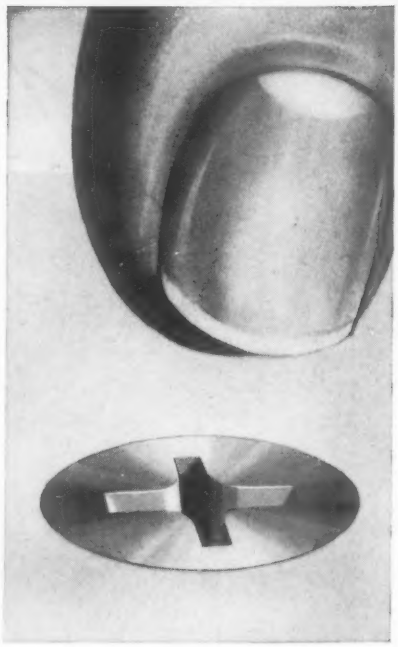
Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE

WIRE FOR INDUSTRY

Screw mates with driver

Goes in at top speed



Can't slip to mar surface

PHILLIPS SCREWS...the fastener with a plus!

Continuing Product Improvement (A few of many recent design changes in the Phillips screw)

- Change to 2° wing to provide more effective driving, better driving fit.
- Fillet added at upper edge of recess to permit easier driver entry and freedom from burring during driving.
- Substitution of a #2 (larger) recess for #1 on size 6 Phillips truss heads for better driveability and longer tool life.
- Slight increase in depth of Phillips recess on 100° alloy aircraft parts for better driveability without loss in head strength.

Phillips cross-recessed-head design helps you speed production, reduce costs...here's how:

Compare Phillips Cross-Recessed-Head Screws with other types of fasteners on production speed, alone!

With Phillips screws, the cross-recess mates with the driver. There's no danger of driver slippage, no slow-down in production. On the contrary, Phillips screws are ideal for use with power drivers in automatic assembly operations. Matched mating of bit and recess permits speedy assembly in awkward positions by a single operator. This perfect alignment assures straight and true driving, reduces effort required, cuts worker fatigue and increases efficiency.

But increased production speed at reduced cost is just one of the big reasons behind the continued growth and national acceptance of Phillips screws today. Greater holding power and improved appearance are other important factors that have led to this widespread adoption of the Phillips recess by so many leading users in practically every type of assembled product.

What's more, Phillips Cross-Recessed-Head Screws are constantly improved for more efficient driving and better quality in your finished product. (See box copy.) The Phillips recess is made in every type of head configuration to a universal standard by most leading fastener producers. On your fastening jobs, specify these high quality Phillips Screws. 9-1

SCREW RESEARCH ASSOCIATION

(Licensed Manufacturers of Phillips Screws and Drivers)

PHILLIPS CROSS-RECESSED-HEAD SCREWS . . . THE FASTENER WITH A PLUS

Use postpaid card. Circle No. 223

by **Darrell Ward,** Engineering Editor

Standardization of wiring techniques eliminated possibility of confusion in building up multiple wire harnesses for a new home-sized organ

Kimball tradition applied in . . .

THE ASSEMBLY OF ELECTRIC ORGANS

During its first 100 years, the Kimball Company built over 7,000 pipe organs, many shipped to distant points around the world. However, labor and material costs today make it inconceivable for reasonable bids to be made on many of the fine instruments assembled in the past. Kimball has not built pipe organs since World War II.

Yet, the current fever over home-size electric and electronic organs and the rapid growth of such instruments to replace pipe organs in churches enticed Kimball into the following suit.

The fundamental idea originated in the Kimball shop a few years ago. It was implemented by the employment of Merlin Petroff in whose laboratory all of the initial work was carried out. A time was reached, however, when to perfect the final instrument larger facilities were required, as well as special production know-how for the time when the organ would be ready for market.

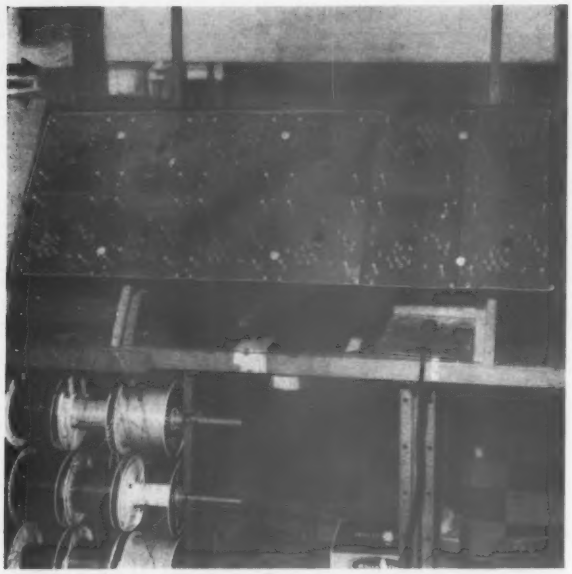
Kimball established a working agreement with Gibbs Manufacturing & Research Corporation of Janesville, Wisconsin. The years of experience this latter company has had in computer, guided missile, and other electronic work proved to be the missing link. The "partnership" arrangement resulted in what both companies believe to be the right combination of the most needed ingredients. Kimball builds the cases and handles the merchandising of organs. Gibbs produces the electronic and mechanical assemblies to specifications equal to the most advanced practices in their field. Together, they are turning out an instrument that is intended to make new history for organs and particularly for the W. W. Kimball Company.

Quite frankly, the new organ differs radically from other popular makes, and is claimed to reproduce almost exactly the tone of genuine pipes.

The Kimball operates on the photo-electric cell principle with an interrupted light beam passing through a tone picture plate, or mask, into a parabolic reflector with photo cell mounted in the center. The mask is made up of annular rings of single tone patterns, each being aligned with a lamp and lens to project parallel light rays through its tone pattern orifice. The innermost ring of patterns produces the lowest frequency, the outer rings producing higher frequency multiples or successive octaves of the same note. The light beams are interrupted with a slotted scanning disc rotating at a predetermined speed by belt driven pulleys to establish desired pitch. Twelve such units are required to produce the full chromatic scale. Vibrato is introduced by a solenoid actuated arm and eccentric drive wheel alternately to speed and retard the belt at vibrato frequency.

This method of sound reproduction is similar to that from the sound track of movie film. It can be as accurate in fidelity of tone quality, subject to

continued



Printed circuit boards for twelve tone generators are ready for hook-up. Color coded wire on reels is used in making up the intricate harness of keying cables.

Assembly of Electric Organs, continued

limitations of associated amplifier and speakers. The masks for each note and each rank of voices were engineered to match an oscilloscope pattern and vector analysis of tones from pipes selected by the company as the best obtainable. The diapason rank is from one pipe organ, the reed family from another, the flute from another, each considered the best of its type. These were all consolidated in the basic masks of the tone generator system inside every Kimball organ.

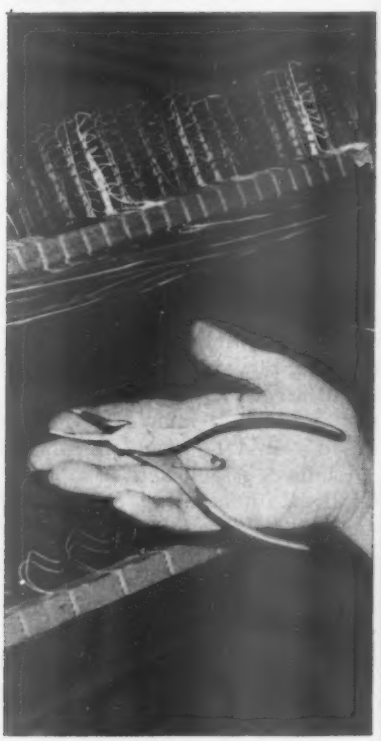
Except for the two years of research and development in producing satisfactory masks, the rest of the instrument involves typical assembly of electrical and mechanical sub-assemblies as in traditional pipe organ practice, modified to the requirements of its modern counterpart.

Building up the wiring harness with connector blocks and installing keys in the two manuals were the most interesting details of this assembly.

Kimball builds two models, the 250 featuring church organ tones and stop tablets, and the 225 entertainment type for home use. The larger con-

Left: Girl at right connects lamps and lays cable wire toward left over guide pegs, while girl at left ties connections to contact blocks with special pliers.

Below: Standard pliers are reground to remove surplus metal in jaws to permit better clearance for wrapping the closely spaced contacts.



tains two full 61 note manuals, the smaller 49. Both are built to orthodox standards and American Guild of Organists (AGO) specifications, except for the 25 note pedal board and shorter manuals on the Model 225. The Model 250, on the other hand, is equivalent to a 6 rank pipe organ, unified to make available 16 stops on the manuals and 6 on the pedals.

Since each different rank of tones comes from different light beams and masks, there must be one contact for each on every key. And, since certain tones are available at different octave levels from the same key, for 16′, 8′ and 4′ stops, additional contacts are required for this coupling.

These switching contacts are like a multi-contact block in a multiple circuit relay. A key must operate 9 independent contacts each time it is depressed by a player. Wiring of all these contacts would be an impossible confusion without standardized techniques.

First, the twelve-tone generator printed boards, with lamps attached, are stacked on a supporting work fixture. Below, toward the left, is another rack which supports 12 reels of color-coded hook-up wire. Color coding simplifies circuit tracing.

To the left of this work station is another equipped with a fixture for holding all contact blocks, upper and lower manuals as well as pedal. The harness for an entire organ is built as a single unit before it is removed.

One girls picks up a wire from the reels, cuts, strips and ties it to one of the lamps. Then she lays it out in cable position around wood pegs. A second girl picks up the same wire and runs it along her fixture through slots to the individual contacts. She cuts, strips and winds the end quickly around the contact wires which project through the rear of the contact blocks. Each wire is bent "U"-shaped to retain the wrapping.

"SWEATING" RESIN ON CONNECTIONS

After a team of two girls lays up 100 to 125 wires, they both begin to solder. These two steps, tying connections and then soldering, take about 50 minutes at average speed. Small 75w soldering irons are used to sweat a drop of resin core solder on each connection.

When the first team has completed their segment of the harness, they move to the next work station and repeat. Four such teams complete the full organ, each connecting about the same number of wires in rotation.

continued

Tips of springs are touched with a non-bonding adhesive which makes them cling to pressure channel, but allows relocation and adjustment.

As each key is placed in metal pan, guide felts are adjusted to make keys function smoothly without binding.

An assembled organ is easily exposed for service or adjustment by lowering back panel and raising manuals. Back panel mounts twelve tone generator units. Amplifiers are mounted in base of cabinet.

One team is not required to wire a complete assembly. It was found that 100 or so wires was the optimum number. Fewer connections would make teams shift too frequently. Many more, without shifting, would cause fatigue and make more difficult the worker training because of too many connections to remember.

It was interesting to see how the girls could wrap three turns of No. 28 wire so quickly around the .018" coin silver contacts so close together. Ordinary small nose pliers are too fat for clearance and would tend to break or bend adjacent contacts. So, standard long nose pliers with cutters were reground to remove the bulk of metal on the outside of the jaws. This gave much better clearance and removed a serious problem.

When the last team has completed its segment of the wiring harness, the cables are laced and the harness removed from the fixtures. New circuit boards and contact blocks are stacked for the first team to start anew.

Besides multiple contacts for each key on an organ, specifications call for a certain amount of pressure to actuate a key. The pressure must be equalized for all keys of both manuals. An interesting arrangement takes care of this problem and others at the same time.

Keys rock on knife edge pivots. Tempered helical coil springs, mounted on a metal pressure channel, press down on the keys but at a point 3/16" back of pivot center. This holds the key in place and makes it return to its up-stopped position after being played. The springs are precision ground to specified length within a tolerance of plus-or-minus .005".

But, helical coil springs do not present a flat ring or circular face to a pressure surface. The ends cannot be ground fully flat. The resulting taper in the last turn produces an irregular pressure around the perimeter.

The company makes good use of this characteristic. By rotating a spring in its seat, the irregular pressure can be regulated more toward the front or toward the rear of center. With such micrometer type of adjustment, exact key pressure can be obtained for the required 1½ ounce loading on each spring. With this loading offset from pivot center added to the spring loading from contact blocks at the rear of each key, Kimball develops a 3-ounce pressure for the small organ and a 3½ ounce pressure for the large one. These pressures have been found more desirable in the popular market than the AGO specified 4-ounce pressure for classic-romantic organs and 5-ounce pressure for the Baroque.

Because the pressure channel must be inverted in assembly to make the spring press downward against the keys, the 49 or 61 springs must cling to the channel after they are assembled with proper spacing. Yet they must be adjustable and easily removable, if necessary.

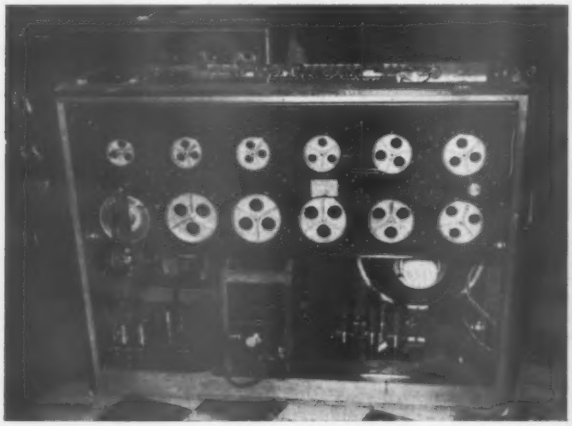
NON-BONDING ADHESIVE SOLVES PROBLEM

The problem is solved with a non-bonding adhesive which retains the springs with adequate adhesion. Since it never hardens, this adhesive permits removal or repositioning but will prevent accidental dropping of a spring.

Kimball keys are made of hollow molded acrylic screwed to metal key channels. Hidden below toward the front of each key, is a felt faced offset clip which serves as the up-stop tab. This tab rides up and stops against a flange turned in at the front of the key pan. All keys must return to rest in the same

Left: With a step gage resting on the keys, a skilled adjuster bends wire contacts into proper position in the contact block after the unit is fully assembled.

Below: Completed organ is left with top off until after final adjustment of contacts, regulation of drive mechanism, and final inspection. Tone generators are similar, but produce different pitches because of progressive differential in drive pulley diameters.



For Additional Copy of this Plan Use Postpaid Card. Circle No. 310

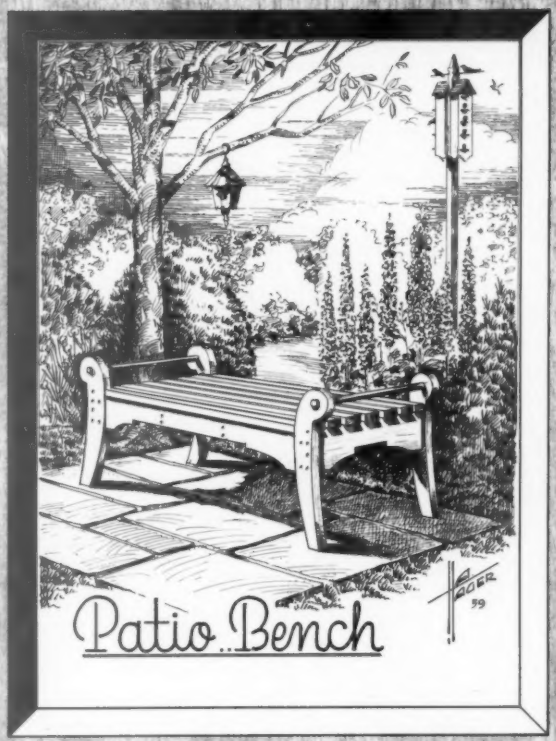
HOME WORKSHOP

For Additional Copy of this Plan
Use Postpaid Card. Circle No. 310

ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

Hobby-neering with "ROCKFORD" Screw Products

HOME WORKSHOP PROJECT of the MONTH



Hobby-neering with "ROCKFORD" Screw Products

ROCKFORD ILLINOIS

ORIGINAL DESIGNS

JULY 1959

COPYRIGHT 1959 ROCKFORD SCREW PRODUCTS CO., PRINTED IN U. S. A.
2501 NINTH ST. ROCKFORD, ILL.

Patio .. Bench

SCALE:
INCHES 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
5½"
1/8" ø DOWEL (F)
23½"
18"
15"
2" NO.12 O.H. WOOD SCREWS
20"
BILL .. OF .. MAT
4 PCS. 1⅛" x 5½" x 23½" LEGS "A"
2 " 1⅛" x 5½" x 50⅛" RAILS "B"
2 " 1⅛" x 5½" x 21½" " "C"
2 " 1⅛" x 3⅜" x 19½" TIES "D"
7 " 1⅛" x 2½" x 53½" SLATS "E"
2 PCS.
4 OOZ.
SIDE .. ELEVA
RIGHT HALF SIMILAR ABOU
HALF .. PLAN
HAGER DESIGN STUDIO 2-21-52

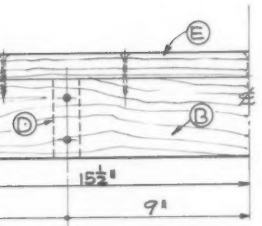
Hobby-working with ROCKFORD Screw Products

HOME WORKSHOP PROJECT of the MONTH

For Additional Copy of this Plan
Use Postpaid Card. Circle No. 310

ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

nch

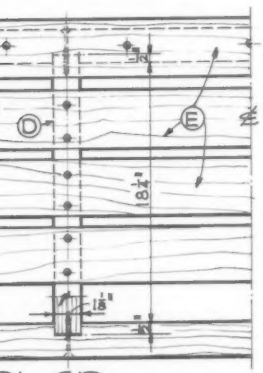


..MATERIALS

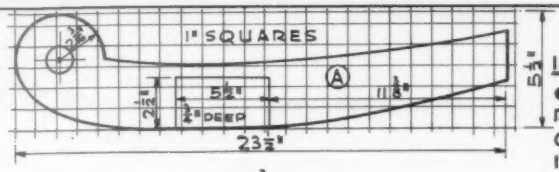
S "A"	2 PCS. 1/8"ø x 2¾" DOWELS "F"
S "B"	"ROCKFORD" WOOD SCRWS
"C"	4 DOZ. 2" NO. 12 OVAL HEAD
S "D"	
TS "E"	

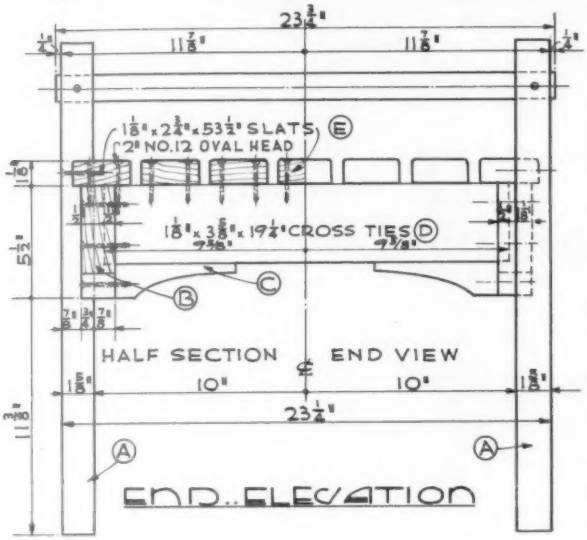
LEVATION

ILAR ABOUT CENTER LINE



PLAN





END..ELEVATION

INSTRUCTIONS:

- KEEPING PACE WITH THE RAPIDLY CHANGING WORLD OF SCIENCE, NATURE TOO IS IN CONSTANT CHANGE TO MEET NEW DEVELOPMENTS IN PLANTS & FLOWERS.
- NEVER BEFORE HAS THE GARDENER HAD THE PLEASURE OF SELECTING SO MANY NEW & DIFFERENT VARIETIES OF PLANTS, THANKS TO THE PATIENCE OF THE MANY OUTSTANDING HYBRIDIZERS WHO CREATE & PRODUCE SO MANY GORGEOUS THINGS
- THE GENERAL LAYOUT & LANDSCAPING PATTERNS OF LARGE OR SMALL GARDENS NOW INCLUDE PAVED TERRACES, PATIOS EQUIPPED WITH BRICK OR STONE FIREPLACES, PICNIC TABLES & LOUNGING CHAIRS.
- IN SHELTERED NOOKS BIRD HOUSES & MEDITATION BENCHES MAKE THE GARDEN A SANCTUARY.
- THERE AMONG THE COLOR, FRAGRANCE & BEAUTY, ONE CAN COMMUNE WITH HIS MAKER, IN PEACE.
- THE PATIO BENCH SHOWN HERE, I DESIGNED WITH BEAUTY & RUGGEDNESS IN MIND. IF YOU PREFER THE RUSTIC EFFECT, USE REDWOOD OR CYPRESS FINISHED NATURAL, IF BENCH IS TO BE PAINTED, PINE CAN BE USED. SAW OUT PIECES, DRILL HOLES FOR "ROCKFORD" WOOD SCREWS, ASSEMBLE WITH STEEL SCREWS IF BENCH WILL BE PAINTED.. BRASS IF FINISHED NATURAL OR STAINED.
- BY THE WAY I WANT TO THANK YOU ALL, WHO HAVE WRITTEN ME FOR THE OUTDOOR FIREPLACE FOLDER. I WAS HAPPY TO FILL SO MANY REQUESTS, BUT I REGRET THAT I AM UNABLE TO SEND BACK ISSUES OF "HOBBY-NEERING" SINCE A CERTAIN QUOTA IS PRINTED EACH MONTH & WHEN THEY ARE GONE OUT THATS ALL. SORRY.

Hang on to the ones you have.

HERM.

Hobby-neering®

SERIES.. NO. 9

PROJECT 6

Designed by A. ADER OF ROCKFORD

USE FOR COMMERCIAL PURPOSES IS STRICTLY FORBIDDEN

★ QUALITY CONTROLLED "ROCKFORD"

Steel and Non-Ferrous

CAP AND SET SCREWS

We invite you to send for our latest Catalogs and Price Lists. They contain a complete line of "ROCKFORD" Screws and Bolts for easy selection keyed to your threaded fastener needs.

FORD" PRODUCTS ★

Ferrous

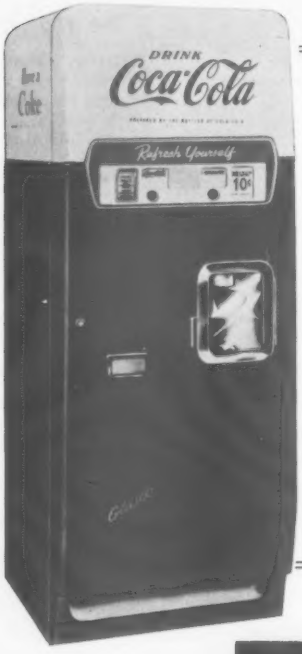
EWS

logs and
line of
selection

DO YOU KNOW?

Many people are surprised to learn of the many different services Rockford Screw Products offers its customers. Service is our business, and it is our constant aim to help you with any or all *fastener* problems that may arise in your assemblies. Send us your ideas, blueprints or samples; perhaps we can make your parts better, faster, and cheaper by our advanced method of Cold Forging from wire.

★ HERE THERE AND EVERYWHERE with "ROCKFORD" Screws and Bolts ★



Glasco 2-DRINK
UTILITY MODEL
Pre-mix Vendor

Automatically serves up to 500 drinks and offering a selection of two different pre-mix products.

Model G400-U2

Manufactured by:
GLASCOCK BROS. MFG. CO.
Muncie, Indiana

FLEXANGLE
UNIVERSAL SLOTTED ANGLE SYSTEM

"The Quick Solution to many Plant Maintenance Requirements"

Manufactured by:
FLEXANGLE CORPORATION
3760 Oakwood Ave.
Youngstown, Ohio

No. 8 Access Ladder

For Additional Copy of this Plan Use Postpaid Card. Circle No. 310

ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

Hobby-nomics with "ROCKFORD"

"ROCKFORD" HOME WORKSHOP PROJECT of the

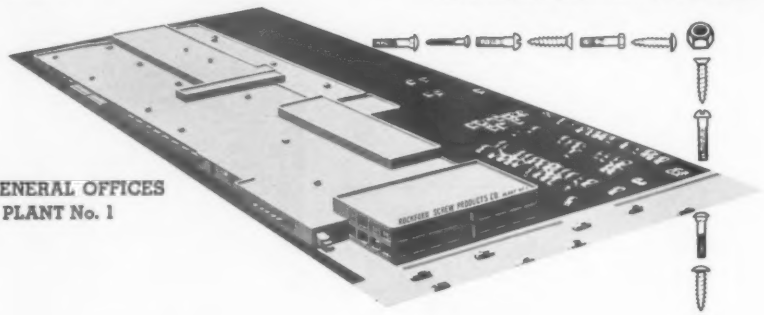
PROJECT of the

ROCKFORD

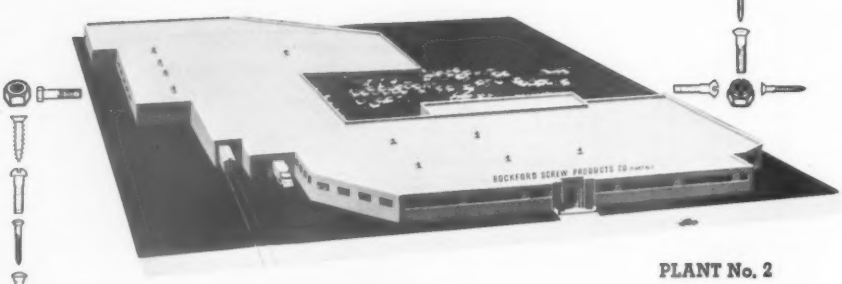
Rockford, Illinois

TELEPHONE
WOodland
4-9441
TELETYPE
R.K. 7603

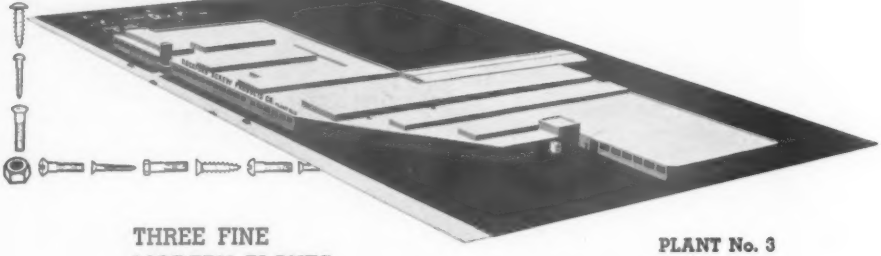
"ROCKFORD"®
Screw Products Co.
2501 NINTH STREET - ROCKFORD, ILL.



GENERAL OFFICES
& PLANT No. 1



PLANT No. 2



PLANT No. 3

THREE FINE
MODERN PLANTS
PRODUCING "ROCKFORD" QUALITY CONTROLLED
THREADED FASTENERS FOR AMERICAN INDUSTRIES.

For Additional Copy of this Plan
Use Postpaid Card. Circle No. 310

ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

Hobby-rearing with "ROCKFORD"

"ROCKFORD"®
HOME WORKSHOP
PROJECT of the
MONTH

ROCKFORD SCREW PRODUCTS CO.
Rockford, Illinois

Exploded view shows details of parts making up one of the 12 tone generators. Lamps fit inside tubular cells which also carry lenses to make light rays parallel. Beam shines through orifices in mask and are interrupted by slotted scanning disc. This disc is driven by shaft which feeds through assembly to drive pulley at rear. Interrupted light beam is focused by reflector on photo cell not shown.

plane. Any irregularity across the keyboard would be detrimental to the instrument's appearance and a handicap to the musician.

Adjustment of the up-stop is made by bending, with the key held in a jig mounted on a profile projector. Tolerance is easily held within .003" of specified position.

At the back end of each key channel, there is another felt-faced offset projection which serves as the contact lifter. This lifts individual contact blocks, moving the 9 contact wires like the movement of a relay armature. The contact wires must be deflected just enough to make a clean connection with busses at a predetermined drop of a key. Therefore, the contact lifter of each must also be individually adjusted. Lifters are adjusted in the same holding jig at the profile projector. A dial indicator mounted on the jig gives readings for this part which is brought within a tolerance of $\pm$ .002".

Besides spring pressure and vertical travel, keys must be brought into alignment in the pan to work freely without rubbing. This is accomplished with guide felts made to fit inside the hollow keys. The felts are cut somewhat short of full clearance width. But, when they are riveted to support tabs turned up from the bottom of the key pan, the pressure of the rivets expands the felts to fit snugly. Final adjustment is made either by further squeezing the felts or crimping them back slightly with pliers.

Stop tablets are patterned after standard pipe organ practice. They have spring-loaded snap action for positive on or off positioning. Adjustable linkage connects the stop tabs with banks of .150" fiber glass rods, one rod for each horizontal row of contacts, or a total of nine rods per sub-assembly.

The rods are notched with key flats to match each vertical bank of contact wires. When a stop tab is actuated, the linkage rotates a rod to present either a flat or a round surface to the wires. If flat, the wire bends into the notch and makes a connection when a key is depressed.

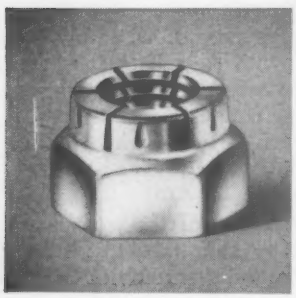
It is in this manner that any of the 9 series of contacts can be selected by stop tabs to produce the many available voices and ensembles of the Kimball organ. The unique feature is that each of the 9 contacts for every key feeds tone from a separate tone source, unlike the borrowing and multiple filtering of tone qualities from one or two ranks of tone generators in other organs. And, each photo cell tone mask orifice creates the individual tonal quality of its corresponding pipe in an organ rank. Instead of multiplying or dividing the frequency of a characteristic tone to produce the different pitches in a full scale of an organ voice, every note is, note for note, a single reproduction of a single pipe tone. Therefore, the voicing of a rank of tones in the Kimball electric is as realistic and natural as the original voicing of the prototype ranks of pipes selected for reproduction.

This is the feature which sets the Kimball apart from other electric and electronic organs. If sufficiently recognized and promoted, it could be the feature which may make Kimball history repeat itself. At least, it conforms to the long held Kimball tradition of attempting to give the public the most instrument and best quality for the lowest reasonable cost. The goal is not compromised for expediency in assembly. •

SPS RELIABILITY / *A dynamic standard of predictable performance*

FLEXLOC self-locking nuts keep your assemblies intact, despite impact, shock or vibration

Stroboscopic photo shows action of transfer mechanism on a cold-forging machine operating at approximately 16 cycles a minute. The numerous FLEXLOC locknuts used to fasten this assembly stay put despite constant shock and vibration, eliminate the nuisance of frequent retightening.



FLEXLOC self-locking nuts help solve the problem of keeping threaded fasteners tight. Repeated shock, high-speed oscillation, heavy pounding will not shake them loose. They help give your products greater reliability, a qualification that is no longer just a talking point, but a major competitive advantage.

FLEXLOCs are 1-piece, self-locking fasteners requiring no lockwashers, jam nuts, cotter pins or wiring. There is nothing extra to put together, come apart or get lost . . . and no nonmetallic inserts to deteriorate, be chewed up by rough bolt threads, or weaken the structure of the nut. With a FLEXLOC, every thread, including those in the locking section, carries its full share of the tensile load.

A FLEXLOC goes on like an ordinary nut. Start it with your fingers; tighten it with a hand or speed wrench. As soon as 1½ threads are past the top, the FLEXLOC is fully locked. It serves as either a locknut or a stop nut.

Because they require no auxiliary locking devices, FLEXLOCs facilitate design and specification, simplify inventory and handling, reduce assembly time and costs. They also save on maintenance, because they are readily removed and can be reused repeatedly without impairing their locking reliability. See your authorized FLEXLOC distributor for complete information on sizes, materials and finishes. Or write SPS—manufacturer of precision threaded industrial fasteners and allied products in many metals, including titanium. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 78, Pa.

SPS **Jenkintown • Pennsylvania**

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada, Ltd. • Unbrako Socket Screw Co., Ltd.

Use postpaid card. Circle No. 225

DIRT-PROOF JOINTS FOR FOOD CARTS

Collapsible carts must be fabricated in a manner that eliminates cracks, faying surfaces or any other hidden areas

by **William Buschmeyer**
Product Planner
McClintock Manufacturing Co.

Describing any assembly operation—"from the first bolt to the last nut", so to speak—provides a minimum of information for others. Step-by-step assembly operations usually apply to a single product only, and cannot be duplicated in sequence where another product is involved. However, most progressive assembly lines employ specific processes or techniques for specific sub-assembly or assembly operations which, with a bit of modification, can be adapted in the manufacture of many products. These assembly line "highlights", as they might be termed, are often independent of other operations on the same line, and will provide the same advantages during the assembly of totally different products.

The purpose of this article is to describe some of the more adaptable highlights in use at McClintock Manufacturing Company, a division of Ekco Products Company, Whittier, California.

For many years, McClintock has been a major producer of food handling equipment for large food stores and markets. Products include customer grocery handling carts, a variety of meat handling carts, and carts for the display and handling of vegetables.

Most of this equipment is mobile, is mounted on rubber casters, and can be moved as desired. In general, the units consist of tubular cold-rolled steel framework in which interchangeable wire shelving, shallow or deep pans, or deep wire baskets can be mounted at will. Some of the unit frameworks are made collapsible after the shelving or baskets are removed, thus providing for compact storage when they are not in use.

These collapsible units are generally equipped with cold-rolled steel corrugated side panels, with the corrugations serving as "runners" for the baskets or shelves when they are inserted. The rigidity of the basket or shelf itself, after insertion, provides rigidity for the entire unit. In many of the non-collapsible units, the containers are either brazed or projection welded to the tubular frame members.

continued

This collapsible cart is typical of food handling equipment made by McClintock. Rigidity during use is provided by trap and pan inserts. Collapsible feature permits storage in a minimum of space.

Units must be corrosion resistant, easy to keep clean, as well as look clean to customers in food stores or markets

Some of the larger units, because of their size when assembled, can be "knocked down" for shipping purposes.

A major problem involved in producing this type of equipment is one of sanitation and cleanliness. Each unit must be assembled in a manner to eliminate cracks, crevices, faying surfaces, or other hidden areas where food particles or other dirt could accumulate. It must be easy to keep clean. It must be finished in a manner to provide maximum corrosion resistance. And just as important, the units must look clean to the food store customers who will see or use them.

Because of this cleanliness and sanitation problem, many of the processes and techniques developed over the years along the McClintock assembly line are specifically designed to eliminate hidden surfaces where dirt or other impurities might accumulate.

Projection welding plays an important role in this extended and continuous effort. This welding method effectively fuses the joining surfaces together, leaving no space for dirt entrance. It joins the faying surfaces so tightly by means of multiple spot welds that entrance of dirt is practically impossible. A 125 kva Taylor-Winfield welder, with different tooling for different jobs, is used for this type of assembly work.

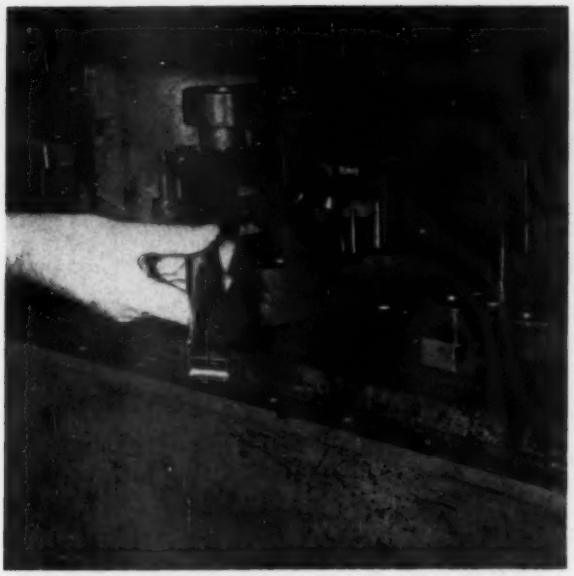
DIMPLING ASSURES TIGHT SPOT WELDS

In welding formed sheet metal frame components together, one of the faying surfaces is pre-dimpled. The number of dimples corresponds with the ultimate number of spot welds used to close the joint. The dimpled faying surface is then placed against the flat faying surface between the electrodes of the projection welder. The area of the electrodes is approximately the area of the surfaces to be joined.

When the electrodes are closed upon the work, the current is conducted from one faying surface

These lug-and-rachet parts are slip-fitted on tube components, then held in place with multiple spot welds. This technique is just as efficient as using a press-fit, threads, or keys to hold components on shaft.

Dimpled frame member is joined to flat frame member by projection welding. Though metal fuses only where dimples exist, a dirt-proof joint is obtained.



Tube ends are flattened in tooling setup installed in a power shear. Flattened tube ends are then joined to other frame members by projection welding.

to the other only through the apex of the dimples making contact between them. The resistance at these contact points creates heat and starts metal fusion. As machine pressure on the electrodes increases, the dimples crush down and fusion continues. The faying surfaces are ultimately forced tightly together. At this point the current automatically shuts off and the fused metal solidifies in the spots where the dimples had once existed. The electrode pressure then releases so that the part can be removed.

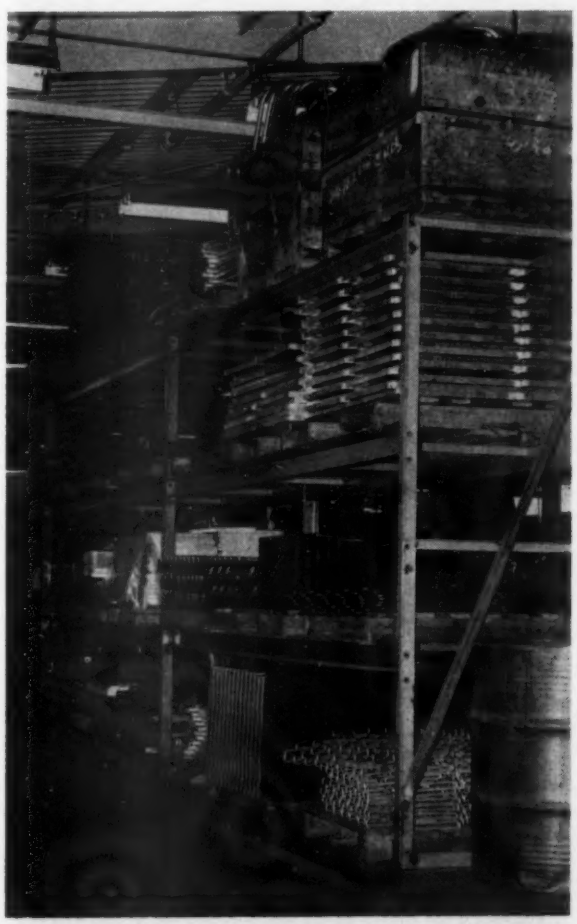
The result is a tightly-welded joint, held together by several localized spot welds and accomplished in a single operation. It is much faster, and overall joint tightness is far better than could be accomplished by using several spot welds made in sequence on a conventional spot welding machine.

Projection welding is used also for attaching hinge bushings onto the collapsible unit frames. This is essentially a resistance welding process. The tooling for this job positions the hinge bushing on the frame member. When the electrodes are closed and the current turned on, the point of contact between the hinge bushing and the frame member has relatively high resistance. This creates the heat necessary to melt and fuse the metal together. Similar setups are used for welding shelves and pans to the framework of non-collapsible units. In all such projection resistance welds, the faying surfaces between the parts are eliminated when the metal of the two parts being joined fuses together into a solid mass.

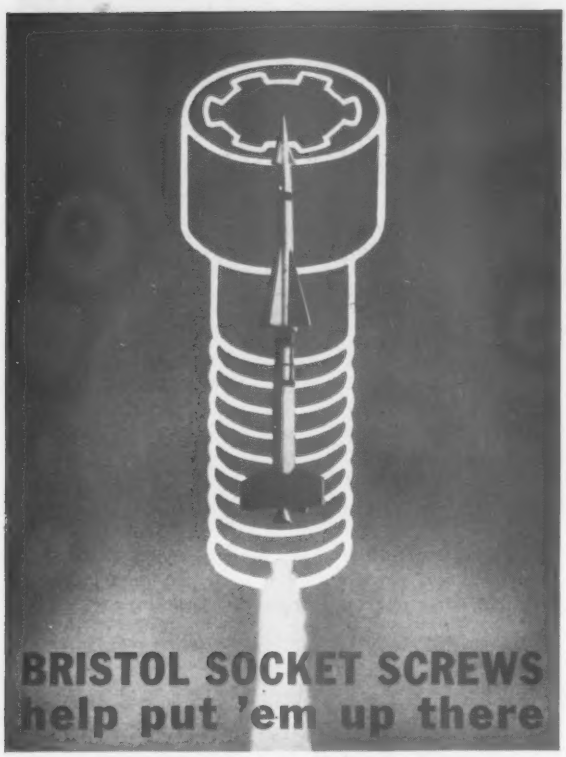
UTILIZE TORCH BRAZING FOR ECONOMY

When resistance welding cannot be used, or where tooling for it would be costly and impractical, torch brazing is used to join the tubular frame components.

continued



Component parts for use on assembly line are stored in these open side racks for easy access. Racks are located along a common aisle and are serviced by lift trucks.



Bristol socket screws are going places in the missile age. They're consistently aboard some of our finest missiles such as the Army's NIKE and the Air Force's FALCON.

There are good reasons why missile-men like Bristol screws, too. They like the burr-proof, strip-proof Bristol Multiple-Spline socket. It allows them to wrench screws tighter to withstand vibration, to loosen and tighten screws more times, if needed, than ordinary socket screws. They know, too, that all Bristol socket screws—industry standard hex, as well as Bristol-originated Multiple-Spline—are subjected to rigid, relentless quality control. Every step—from highest quality alloy or stainless steel stock to finished screw is carefully guarded by a system of checks and tests that reduce failure probability to nil.

And they come in all sizes down to the miniature No. 0 in both set and cap.

Whether you're working on a guided missile, or an earthbound product, find out about Bristol socket screws. See your authorized Bristol socket screw distributor. He can help advise you on the right screw for your application, from the most complete line on the market, in both hex and Bristol Multiple-Spline socket, set, cap and many other types. His fast deliveries from complete stocks can help you out of many a tight spot.

A.S.S.

Precision socket screw manufacturers since 1913
Bristol's Hex Socket Screws
Bristol's Multiple-Spline Socket Screws
*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1½" diam.
THE BRISTOL COMPANY
Socket Screw Division
Waterbury 20, Conn.

Use postpaid card. Circle No. 226

Assembly of Food Store Carts, continued

The four hinge bushings on this end-frame for a collapsible cart were attached by projection welding, using a special jig to hold the joining components.

This brazing method does not create enough heat to produce scale on the cold-rolled steel components; therefore, mechanical cleaning is not required prior to zinc plating. This not only eliminates a costly process, but results in better overall appearance of the brazed joint.

Still another McClintock assembly line highlight is proving very practical, and could be adapted to many diverse assembly operations. At one time short lengths of un-formed tubing were used as cross-member braces in the frame units. These members were either bolted or brazed in place. Today, a conventional metal shear equipped with a tool which flattens both ends of the tubing in a single stroke is being employed. This technique is much faster than the older method, provides a "dirt-tight" joint, and the flattened ends of the cross-members increase their strength and rigidity.

It is often necessary to join the tubular frame components end-to-end during assembly operations. While it would be possible to do this with a butt flash welder, the "flash" would have to be ground smooth at considerable cost. At McClintock, the end of one of the tubes to be joined is swaged down until it will telescope tightly into the end of the other. The joint is then secured by either projection spot welding, or by brazing. As the swaged-down tube end is forced into the unswaged tube until the necked-down portion is reached, a very tight joint is secured.

In one product, it is necessary to assemble a circular lug-and-ratchet component to one end of a long tube. This is accomplished by slipping the lug-and-ratchet component over the end of the tube, then using multiple spot welds to hold it in place. This simple technique eliminates more costly press-fitting, threading, or keying to hold the ratchet component in place.

While not exactly an assembly operation it can be said that assembly simplification starts in the McClintock metal shearing department. Here high

precision automatic shears cut all blanks to exact size. Thus, except in deep draw work, formed parts do not require trimming after forming. Even on deep draw work only a minimum of metal must be sheared away after the forming operation. This precision blanking not only eliminates trimming operation on many parts, but saves considerable sheet metal over a span of time.

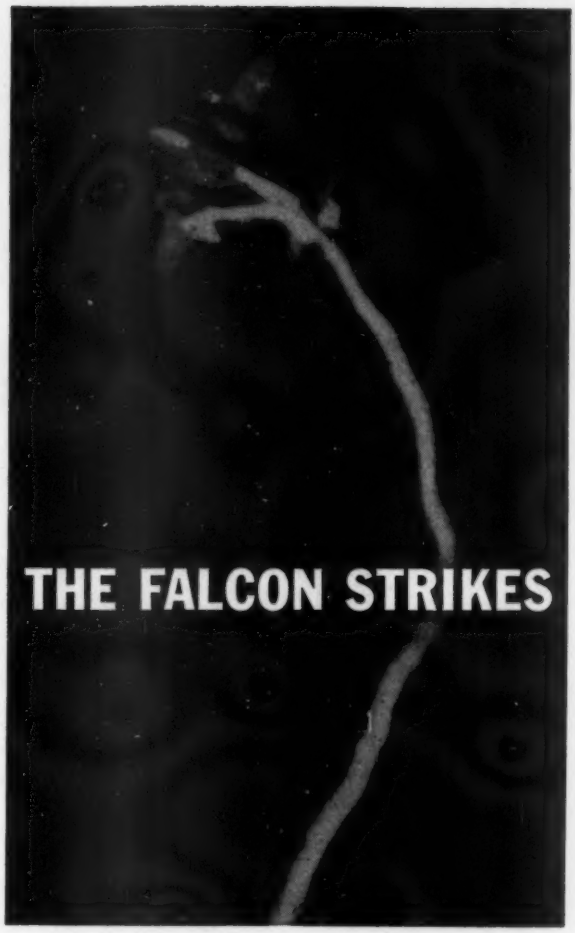
UPSET TOOL SPEEDS RIVETING

Many of the units are equipped with screen door pull-type handles for convenience in handling. These handles are attached using four rivets. But to speed the assembly operation, a small punch press is equipped with an upset tool which heads all four rivets in a single stroke. Considerable time is saved over the use of a machine which inserts only one rivet at a time.

Large sheet metal pans and trays which will bear a considerable load during service require some sort of stiffening. This stiffening is accomplished at McClintock without any additional work or production expense whatsoever. The dies used to form these pans and trays are designed to make small, rounded and easy-to-clean corrugations in the pan or tray bottom at the time of forming. These corrugations provide the additional stiffness required, minus any joints or faying surfaces which might collect dirt.

Most of the McClintock assembly line highlights described in this article provide two specific advantages—lower assembly costs, and increased sanitation and cleanliness. In making these improvements, the latter advantage is always considered first. Any assembly technique that would lower costs, but at the same time impair sanitary features, would be retrogression, and would be cast out as quickly as a playboy from a harem. •

"What do you mean, top-drawer job?"



. . . and Bristol Multiple-Spline socket screws are aboard!

The air-to-air Falcon Missile, designed and built by Hughes Aircraft Company, is now fully operational in squadrons of the Air Defense Command.

Naturally, we're proud that Bristol socket screws were selected for this outstanding new defense weapon. Every Falcon component must meet the most rigorous military standards and must stand up under the most severe environments.

Bristol-originated Multiple-Spline socket screws are ideal for critical holding jobs. They are used in hundreds of products: shavers, communications equipment, instruments, vending machines, cameras—as well as guided missiles.

On sale at leading industrial distributors. Ask your distributor about them today. He can give you sound advice on your application problems and fast service from complete stocks.

A.7.7

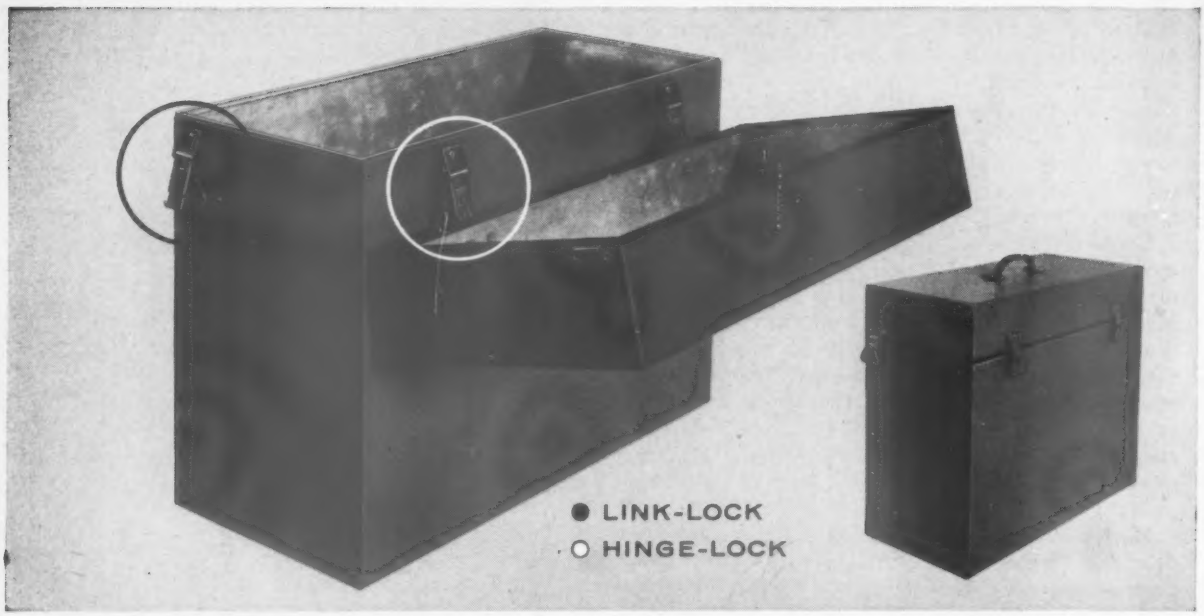
Precision socket screw manufacturers since 1913
Bristol's Hex Socket Screws
Bristol's Multiple-Spline Socket Screws
*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1½" diam.
THE BRISTOL COMPANY
Socket Screw Division
Waterbury 20, Conn.

Use postpaid card. Circle No. 227

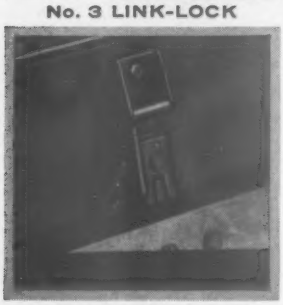
Now

An all-around pressure-tight seal for hinged-cover transit cases with

LINK-LOCK and HINGE-LOCK



No. 3 LINK-LOCK



No. 3 HINGE-LOCK

Two HINGE-LOCK and two LINK-LOCK Fasteners provide all-around sealing pressure on this container manufactured for the U.S. Navy by the Bonded Structures Division, Swedlow Plastics Company.

The new Simmons HINGE-LOCK, used in combination with LINK-LOCK, provides an even, pressure-tight seal on equipment containers and transit cases with hinged covers. A half-turn applies pressure to both types of fasteners. When pressure is released HINGE-LOCK becomes a free-operating hinge, and LINK-LOCK disengages to permit opening.

Originally developed by Simmons Fastener Corp. for the Engineering Department of Swedlow Plastics Company, Bonded Structures Division, HINGE-LOCK is similar in principle and appearance to LINK-LOCK. Both are available in light and medium duty sizes as matched hardware. LINK-LOCK is also available in a higher-capacity, heavy-duty size.

SEND TODAY for complete data, including dimensions, capacities. Engineering service is available... Outline your requirements. Samples on request.

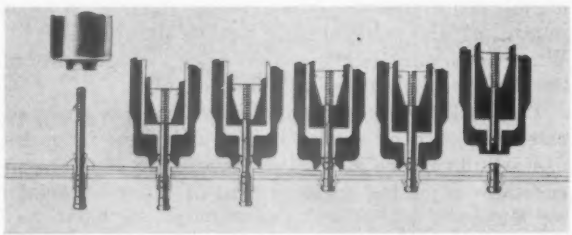
See our 8 page catalog in Sweet's Products Design File

SIMMONS FASTENER CORPORATION 1796 North Broadway, Albany 1, New York

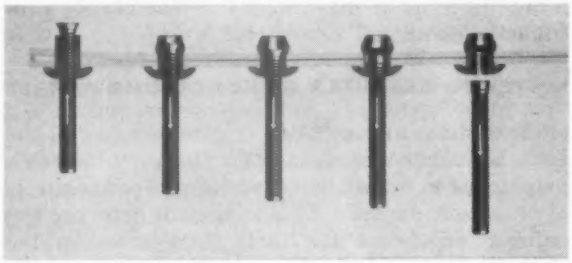
QUICK-LOCK • SPRING-LOCK • LINK-LOCK • HINGE-LOCK • ROTO-LOCK • DUAL-LOCK

Use postpaid card. Circle No. 228

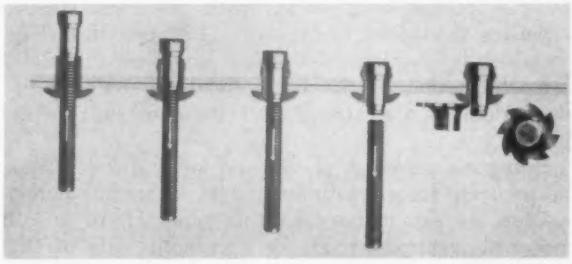
BLIND RIVETS PERMIT ONE-MAN ASSEMBLY



Installation sequence for pull-through blind rivet. Steps shown here and below seem to take place simultaneously.



Sequence in the installation of a friction-lock self-plugging blind rivet.



Installation sequence of a lock-spindle self-plugging blind rivet known as the "conical keystone lock."

With pull-through and self-plugging rivets, fastening operations can be performed from one side of work

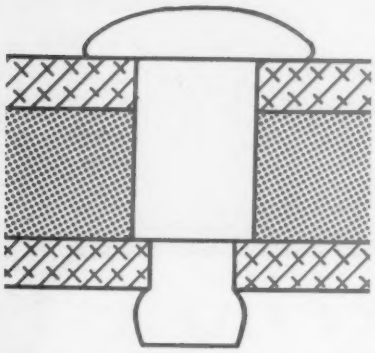
by **H. G. Brilmyer**
Vice President—Research
Huck Manufacturing Company

The ease and speed with which assembly operations are performed—where pull-through and self-plugging blind rivets are used—makes these fasteners worthy of consideration in product development programs. Where blind rivets are utilized, assembly becomes a one-man operation performed from one side of the work. Through use of power-operated installation tools, application speeds up to 1200 rivets per hour can be achieved by unskilled operators. Hand tools may be used where high-speed assembly is not essential.

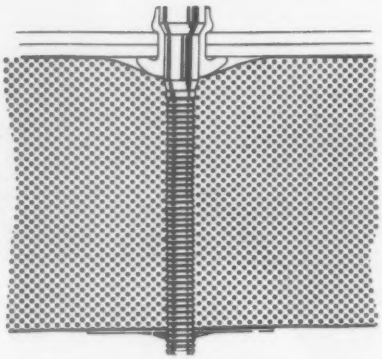
Although the categories, "pull-through" and "self-plugging", provide a good generic breakdown for describing these fasteners, the military goes one step further, providing two classifications for those belonging to the self-plugging family. The military designations are "friction-lock self-plugging" and "lock-spindle self plugging" blind rivets.

Pull-through and self-plugging blind rivets are generally two-piece pre-assembled fasteners, consisting of a hollow rivet sleeve and an installation stem or pin. The pin in the pull-through design has a semi-collapsing head; the pin head is pulled completely through the rivet sleeve during installation.

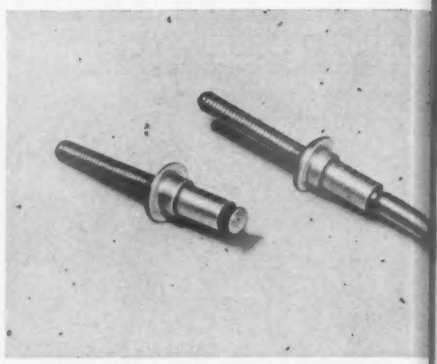
continued



Shoulder-type blind rivets are suited to the assembly of honeycomb or other soft-core sandwich panels.



Here, pintail of self-plugging rivet is retained. Spring clip, pushed on pintail, firmly holds insulation.



Shoulder-type pull-through, left, and self-plugging, right, rivets expand flexibility of these blind fasteners.

The self-plugging designs utilize a pin which is retained within the rivet sleeve following installation.

The method of pin retention forms the basis for differentiating between friction-lock and lock-spindle self-plugging blind rivets. In the friction-lock group, the pin is retained following installation by friction between the pin o.d. and the rivet sleeve i.d. Lock-spindle rivets, on the other hand, have a positive mechanical lock which holds the pin in the rivet sleeve. Design of the locking mechanism and method used to achieve locking action varies with each fastener in the lock-spindle category.

COMPARISON TO CONVENTIONAL RIVETS

The installed pull-through blind rivet is comparable to a conventional hollow rivet in strength, configuration, permanence, and resistance to vibration. In comparison to the pull-through type, the self-plugging blind rivet may be considered the approximate equivalent of a conventional solid rivet.

Both the pull-through and friction-lock types are available from a number of manufacturers, and individual specifications will vary. In general, they are available in either aluminum alloy, mild steel or Monel as standard off-the-shelf materials. Other rivet materials are available as standard only from certain blind rivet producers.

Most common standard rivet diameters offered are 3/32, 1/8, 5/32, 3/16, and 1/4-in. Other sizes are available, including oversize designs for repair applications, but not from all manufacturers or in all materials.

Standard head styles are generally brazier, countersunk, and truss. Flat-head rivets find limited application and are not carried as standard by most manufacturers.

RANGE OF MATERIAL THICKNESS

"Grip range" is a term used to identify the range of material thickness that can be joined by a given fastener. In the matter of grip range data, there is less uniformity among blind rivet manufacturers than in any other single published specification. The range overall is wide, with grips from zero to 1¼-in. covering the full line of available standard items.

Pull-through and self-plugging blind rivets are an ideal selection for assemblies where accessibility is a problem. A choice between the two will depend on job requirements. Where shear strength is most important, the self-plugging design should be used. Where economy is the major design consideration, the pull-through rivet will do the job.

The pull-through design provides the finished assembly with an eyelet hole which may favor its use as a grommet or vent in certain applications, in addition to joining together two or more materials together.

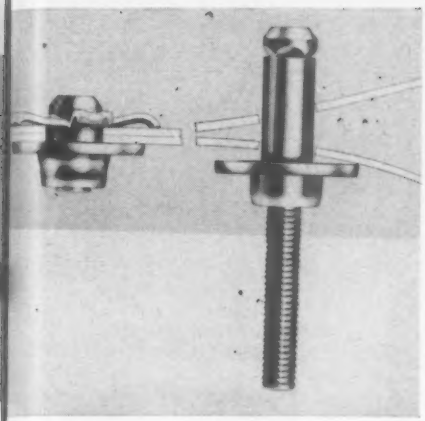
A recently introduced concept that expands the design flexibility of blind rivets is the shoulder-type fastener. In this configuration, the rivet sleeve is provided with a stepped o.d. (shoulder) which establishes the grip of the fastener within closely controlled dimensional tolerances.

SUITED TO ASSEMBLY OF HONEYCOMB PANELS

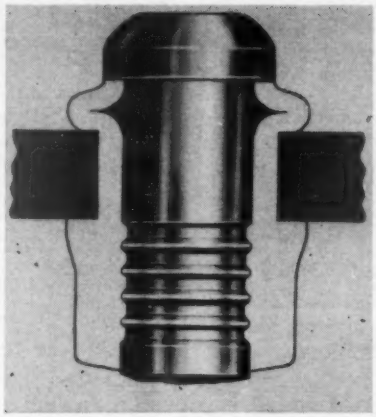
These shoulder-type blind rivets are suited to the assembly of honeycomb and other soft-core sandwich panels, and to installation of metal or wood to sheets of other soft material. This is because they are not entirely dependent for their installation on the strength of the materials being joined.

During installation, the tool pushes against the rivet sleeve head and simultaneously pulls against the pin. At the blind end of the fastener, the pin head is pulled into contact with the rivet sleeve, creating the blind head there. Because the rivet shoulder is backing up the face sheet on the blind side, formation of the blind head is virtually independent of the strength of the materials being joined.

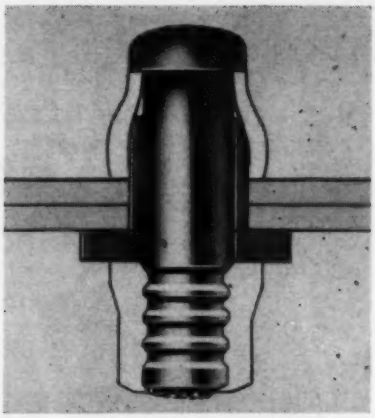
Soft-core sandwich panels and laminates can thus be securely joined without danger of serious deformation. In applications of this type where a soft material is exposed on the accessible side of the panel, the truss-head rivet configuration is frequently used.



Pinhead splits sleeve of this rivet to form daisy-head. Petals guard against tear-out or pull-through.



Typical swaging collar design of lock-spindle fastener is this rivet. Collar is integral part of rivet sleeve.



With Huckbolt, filler sleeve opens expansion sleeve to form blind head. Collar is swaged into grooves in pin.

A variety of blind rivets of the lock-spindle self-plugging type are available to the design engineer and are worthy of consideration. Although slightly more expensive than the friction-lock self-plugging type, they provide certain advantages over the more conventional friction-lock design. Higher strength, improved dimensional accuracy, and positive pin lock are among these features.

FRICTION-LOCK VS. LOCK-SPINDLE TYPES

A significant difference between friction-lock and lock-spindle types is the kind of blind head formed. The head on friction-lock self-plugging fasteners is formed by an open expansion or flaring of the rivet sleeve on the blind side of the work. This is referred to as a "tulip" head, which provides only line contact with the hole.

Blind head formation in the lock-spindle design is generally in the form of a "bulb." By this is meant that the outer end of the rivet sleeve retains essentially its original diameter during installation; the head is formed by upsetting the portion of the hollow rivet between the head of the pin and the workpiece being riveted. The result is a definite area of contact around the hole, providing substantially higher installed strength.

MECHANICAL LOCK ADDS STRENGTH

Improvement in strength is the most frequently used design criterion for selection of lock-spindle self-plugging blind rivets. Higher strength results not only from the use of higher strength alloys, but from the effect of the mechanical lock as well. The positive lock gives the lock-spindle rivets load-carrying ability comparable to solid rivets of the same shear strength.

Where there is no lock other than friction, a conventional two-piece self-plugging rivet becomes critical in tension when installed in sheets whose bearing strength is less than the shear strength of the rivet. Such a joint may fail in rivet tension at loads substantially lower than the allowable bearing load of the sheets. Thus a conventional friction-lock self-plugging rivet may be equivalent of a 2017-T solid rivet when driven in thick sheets, yet may fall far short of the requirements for a 2117-T solid rivet when driven in thin sheets. This condition is particularly critical in the case of countersunk rivets.

Mechanical locks in lock-spindle fasteners are generally achieved with either swaged collars or inserts. In the insert type, the locking member is usually provided as an integral part of the rivet sleeve, projecting above the sleeve head. Locking is accomplished by forcing the projecting insert into a space provided between a recess in the rivet sleeve head and a locking groove in the pin.

In the swaged collar design, the locking members may be an integral part of the rivet sleeve. Locking is accomplished following formation of the blind bulb head by swaging (upsetting) the collar into locking grooves in the pin.

OTHER TYPES OF LOCK-SPINDLE RIVETS

Some lock-spindle self-plugging blind rivets, such as the Huckbolt fastener have the swaging collar as a separate item in the fastener assembly. This rivet also has a filler sleeve, an expansion sleeve, and a washer, making it a five-piece factory assembled fastener. During installation, the expansion sleeve is increased in diameter by the filler to form the blind head.

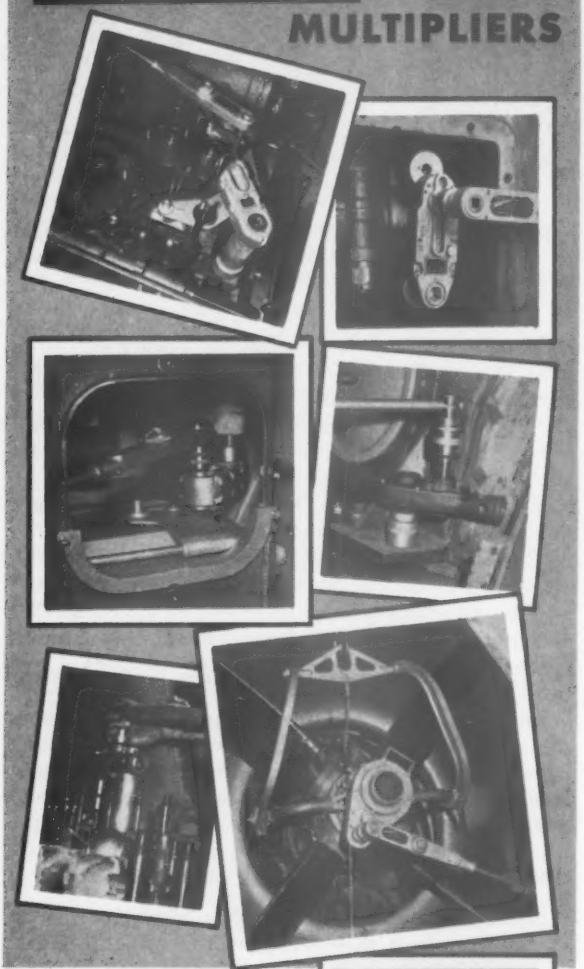
Another lock-spindle self-plugging blind rivet is our split-sleeve type. Introduced three years ago as the Daisy rivet, it is a two-piece design which utilizes the swaged collar for positive mechanical lock.

During installation, the head of the pin splits the rivet sleeve to form a daisy-shaped blind head. The unusually broad bearing area afforded by the spreading sleeve segments (petals) guards against tear-out or pull-through in assembly. This characteristic makes it ideal for use in many types of sheet metal assemblies. Its blind head, combined with the washer on the access side of the workpiece, permits wide dimensional tolerances in hole specifications. •

HIGH TORQUE

NUT PROBLEMS EASILY SOLVED WITH

SWEENEY TORQUE MULTIPLIERS



Sweeney Torque Multipliers are geared wrenches with power ratios ranging from 3:1 up to 31:1 and with strength tests from 1,300 up to 20,000 ft. lbs. output.

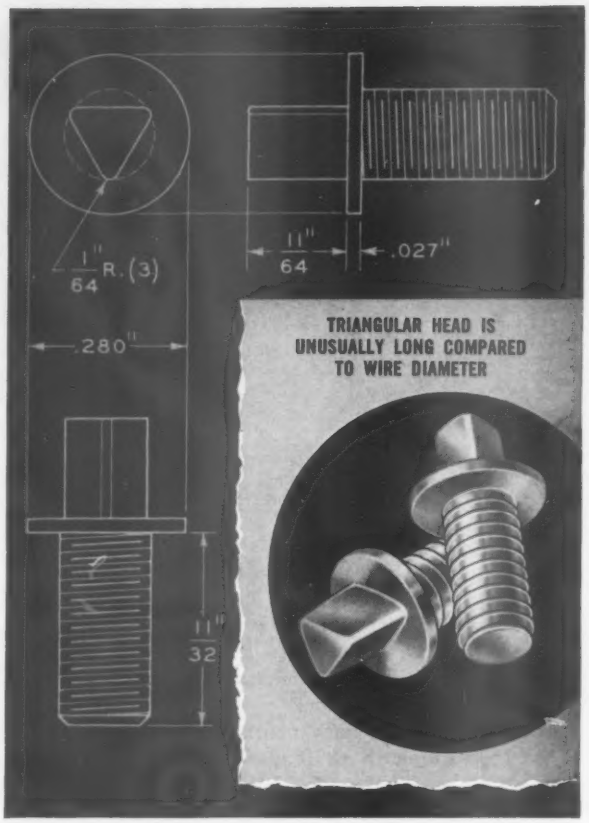
They decrease the manual effort required to tighten or loosen tough nuts and eliminate safety hazards otherwise involved.

Use of torque indicating handles on the input of Sweeney Torque Multipliers assures torques to exact specifications with ease, even in limited working spaces.

Write for descriptive literature and prices.

B. K. SWEENEY MFG. CO. DENVER 16, COLO.

Use postpaid card. Circle No. 229



functional design saved by cold heading

The design of this collar screw would have to be modified to machine it economically. But the design was right for its function. Progressive saved it by cold heading. Only two steps — heading and threading — completed the screw. And we got over 3⅓ times as many parts from the same amount of metal, because a smaller diameter wire could be used, *without waste.*

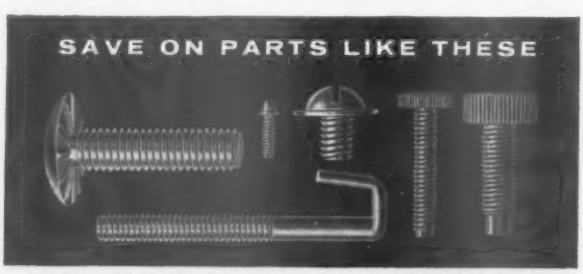
Progressive can save you money, too — and give you naturally stronger parts. Write for more case histories in our *"Bank Book of Savings in Cold Heading."*

MACHINE SCREWS AND NUTS, SEMS FASTENERS, SLOTTED TAPPING SCREWS AND PHILLIPS HEAD SCREWS

THE TORRINGTON COMPANY

Progressive Manufacturing Division

40 Norwood Street • Torrington, Connecticut

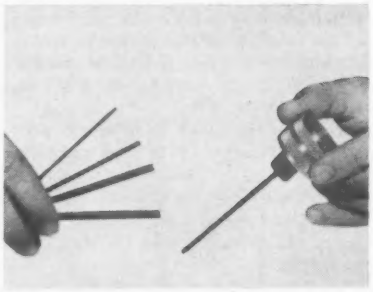


AMONG OPERATIONS PERFORMED BY PROGRESSIVE are heading and extruding simultaneously; flattening; piercing; drilling; bending; pointing; fluted or diamond knurling; trimming; turning tenons, shoulders or recesses; struck or sawed slotting; notching.

Use postpaid card. Circle No. 230

WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 56. Just circle the number on the card matching the number following the description. We'll do the rest.



(See 1)

TORQUE-ADJUSTABLE TOOL TIGHTENS SOCKET SCREWS

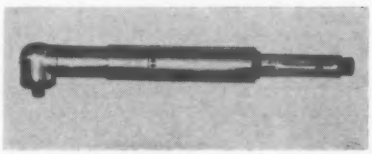
A combination torque-adjustable wrench tightens hex socket screws.

Developed for instrumentation and electronics applications, torque is adjusted from 5 to 18 lbs. by adjusting a torque screw located in the top of the knurled head which increases or decreases pressure on the friction-type spring device.

Five hex wrenches, from 1/16" through 5/32" are machined of heat treated steel.

Herrmann Engineering & Sales Co., 15942 Minnesota St., Paramount, Calif.

Use postpaid card. Circle No. 1



(See 6)

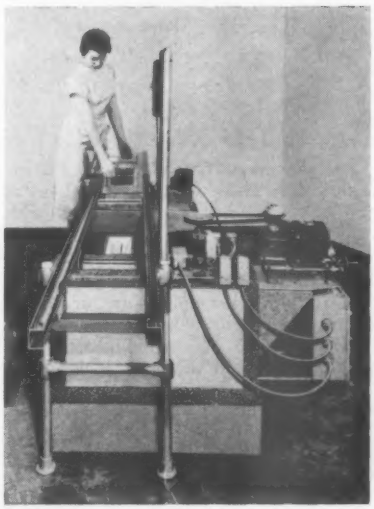
ADHESIVE PROVIDES HIGH STRENGTH AT 300°F UP

A one component adhesive, claimed to provide exceptional strength at 300°F and above, is a smooth, thixotropic paste that will not flow during cure—even when applied to vertical surfaces.

Hysol 2527 is 100% solids and is suited for bonding both porous and non-porous surfaces. The adhesive film has a slight resiliency insuring against cracking during thermal shock.

Adhesives Div., Houghton Laboratories, Inc., Olean, N.Y.

Use postpaid card. Circle No. 2



(See 3)

AUTOMATED SOLDERING LINE BOOSTS ASSEMBLY SPEED

A production line integrated soldering system for printed circuit boards or other electronic and machine component assemblies requires no manual operation between placing an assembled board on the conveyor and removing it after soldering.

Product conveying, flux application, solvent removal, flux and board preheating and soldering are completely integrated into one automated system. The Flowsolder process provides continuous, straight-line single-level processing of components up to 9½" wide, depending on the size of the soldering unit employed, and up to any practical length. Twenty-four inch long printed circuits are being commercially soldered with this system.

A variable transformer controlling the chain drive offers speeds from 6" to 15' per minute. Conveyor height may be varied from 21 to 33" by means of telescoping sections in the unit's legs.

Electrovert, Inc., 489 Fifth Ave., New York, N.Y.

Use postpaid card. Circle No. 3

NICKEL-SILVER WIRE ALLOYS FOR EASY COLD FORMING

Two nickel-silver wire alloys are 18% and 12% nickel silver.

The alloys have excellent cold working properties and are readily formed, bent or cold headed. They are suitably joined by soft soldering, silver alloy brazing, resistance or oxyacetylene welding.

Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Use postpaid card. Circle No. 4

SYSTEM PRODUCES RUST-PROOF FINISHES ON PARTS

An advanced system for producing corrosion resistant, organic film finishes on fasteners and small parts has been developed.

Reported performance of tested pieces shows the system will produce finishes to meet existing rustproofing specifications of fastener users, and can be engineered to meet anticipated higher specifications.

The system includes preliminary phosphate coating treatment before applying the organic finishing film and inhibitor by dip-spin bulk handling methods.

International Rustproof Corp., 1061 East 260th St., Cleveland 32, Ohio.

Use postpaid card. Circle No. 5

RIGHT ANGLE NUTSETTER CONTROLS TORQUE

A right angle nutsetter, weighing just over five pounds, features automatic torque control and automatic shutoff.

The 14 ANS air tool is practically free of torque reaction and converts easily to a two-way tool. Precise torque control is assured through a "no-drift" lock.

A shut-off mechanism stops the air

INDUSTRIAL
RETAINING RINGS
cut costs,
simplify assembly

Precision-engineered INDUSTRIAL Retaining Rings . . . internal, external and open types . . . are available in a wide selection of sizes and finishes. Solve your fastening problems simply and economically with the rings that cut machining and tooling expense, save material, simplify and speed assembly.

Series 1000 and 2000 are available *stacked* for quickest application.

Write for free ring samples and catalog.

IRR *Originators of modern retaining ring dispensing*

INDUSTRIAL RETAINING RING COMPANY
Dept. A-7, 57 Cordier Street
Irvington 11, New Jersey
Use postpaid card. Circle No. 231

motor instantly and automatically when the nut or bolt has been tightened to torque specifications.

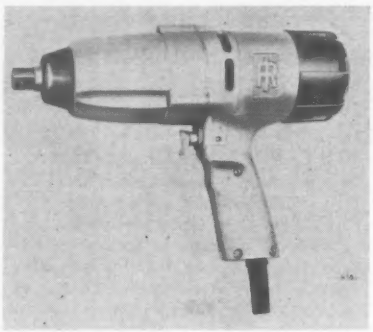
Cleco Div., Reed Roller Bit Co., 5125 Clinton Dr., Houston 20, Tex.

Use postpaid card. Circle No. 6

NUT RUNNER DESIGNED WITH 25 PERCENT ADDED POWER

A ½" drive heavy duty electric nut runner is claimed to deliver 25% more power than standard duty ½" drive tools.

The extra strong hammer case nose of the 5U-HD Impactool is built to last, and the rubber nose cap keeps dirt out and prevents scuffing. A socket retaining pin in the square driver is through-hardened for long life; positive retention also features easy replacement without special tools.



The tool is 10¼" in length and weighs 6 lb. 4 oz. less cable. Side to center distance is 1-7/16". The tool delivers 1900 impacts per minute, and runs at a free speed of approximately 1900 rpm. Primarily for nut running, the 5U-HD can, with standard attachments, drill, drive screws, ream, tap, do wire brushing, hole sawing.

Ingersoll-Rand Co., 11 Broadway, N.Y. 4, New York.

Use postpaid card. Circle No. 7

KIT FOR HARD AND SOFT SOLDERING SERVICE

Kwik-Kit contains an assortment of materials for hard and soft soldering work by professional maintenance men and the service industries.

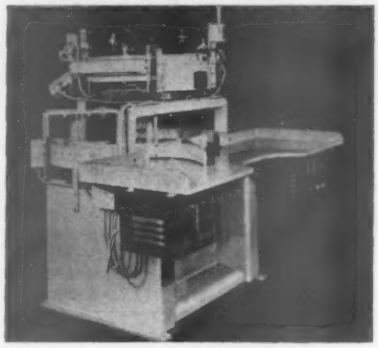
Fluxes are kept in unbreakable squeeze bottles.

The kit is suitable for joining most ferrous and non-ferrous metals, excepting aluminum, magnesium and titanium.

Special Chemicals Corp., 100 S. Water St., Ossining, N.Y.

Use postpaid card. Circle No. 8

PACKAGING MACHINE COUNTS NUTS INTO BOXES



A package filling machine receives cardboard boxes from the operator, conveys them to filling position under a spout, accurately counts out a predetermined quantity of machine nuts as they drop into the box and returns the filled box to the operator.

Output is over 5000 (5/16" hex.) nuts per minute on the Beco 636 or 25 boxes per minute with 100 per box, box transfer consuming about half of the filling cycle. The output varies inversely proportional to nut size.

Each individual piece is counted by a photo electric scanning head and electronic counter, in quickly changeable quantities, from 1 up to 1000; 10,000 or 100,000 per box.

Batchelder Engineering Co., 125 Main St., Springfield, Vermont.

Use postpaid card. Circle No. 9

ULTRASONIC WELDER FOR ELECTRONICS ASSEMBLY

An instrument-type ultrasonic welder designed to make welds in small parts and delicate assemblies has a power capacity of 100 watts.

Many difficult-to-join metal combinations are handled by the W-100-TSL-58-6 unit. For example, superior ohmic contacts are routinely made between such semi-conductors as silicon or germanium and aluminum or gold wire. Electric match and other fine bridge wire assemblies using high resistance wire in the thickness range of 0.003 to less than 0.001" are welded with a high degree of reproducibility.

Aeroprojects Inc., West Chester, Pa.

Use postpaid card. Circle No. 10

SAFETY FEATURE FOR PENCIL SOLDERING IRONS

A three-wire grounded connection has been designed for pencil soldering irons. New terminal design makes this safety feature sufficiently compact for use in miniature irons.

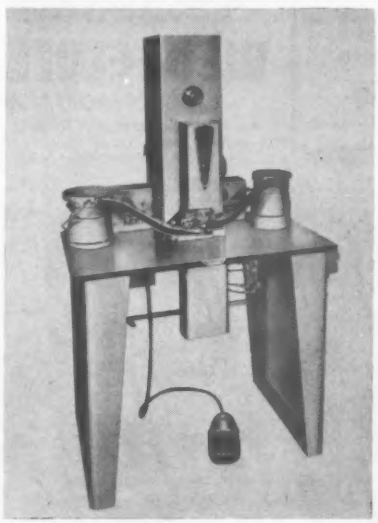
The connection is safe for printed or transistorized circuits, with leakage problems eliminated.

Irons are available for tip temperatures of 550°to 1050°F.

Hexacon Electric Co., West Clay Ave., Roselle Park, N. J.

Use postpaid card. Circle No. 11

AUTOMATIC INSERTER HAS WIDE SMALL PARTS RANGE



An automatic inserting machine can be used on a wide variety of small parts.

For example, it can be used to feed and insert simultaneously the newly-developed two-piece Teflon bushing and feed-through type terminal for electronic circuit boards.

Parts are fed from two hoppers, positioned, and pressed into place by an adjustable cam-operated ram. The cycle is actuated by a two-position foot switch. Insertion rates up to 3000 pieces per hour are feasible.

Interchangeable tooling allows a wide range of possible applications on such parts as terminals, connectors, pins, studs, and many types of fasteners. Electrical interlocking permits usage of Sertomat in automated set-ups such as multiple-head arrangements, and by tape or template control.

Hill Machine Co., 1301 Eddy Ave., Rockford, Illinois.

Use postpaid card. Circle No. 12

Use These GRIPCO NUTS

FOR "FIXED" and "BLIND" fastening to get

★ Easier Positioning ★ Quicker Fastening ★ Positive attaching ★ Less cost

GRIPCO PILOT-PROJECTION WELD NUT

The centering pilot provides quick, easy positioning of nut in pre-punched hole for instant resistance welding. No jigs, no fumbling, no waste of time. No fouling of threads. In two pilot and projection heights with or without the Gripco Locking feature. Sizes No. 6 thru ⅝".

GRIPCO COUNTERSUNK WELD NUT

Countersunk feature eliminates time-wasting re-tapping of nut after welding. The 3 weld projections on both type nuts provide a firm non-rocking electrical connection.

GRIPCO CLINCH NUTS

With or without Gripco locking feature, for positive attaching of a threaded medium to thin metals. Can be automatically fed and clinched or staked with hydraulic or air equipment.

Write for this new FREE catalog today. Ask for samples.

ALL GRIPCO FASTENERS AVAILABLE FOR IMMEDIATE DELIVERY

GRIP NUT COMPANY

113 Maple Ave. • South Whitley, Ind.

Ad No. 122

Use postpaid card. Circle No. 232

Are you DRILLING
TAPPING
POINTING
HOLLOW MILLING
small parts similar to these shown . . . or combinations of these operations?

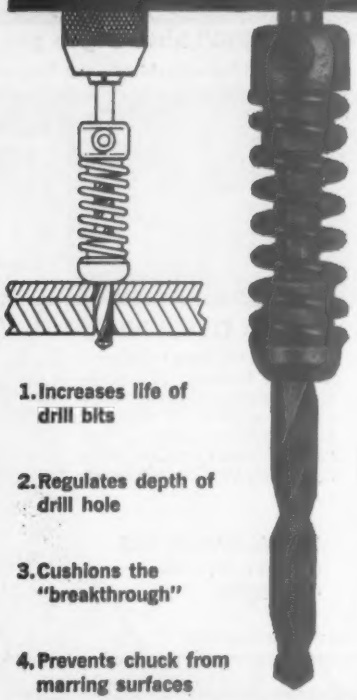
BECO FULLY AUTOMATIC HIGH SPEED MACHINES will guarantee you production up to 10 times that of hand feeding or hand tapping methods. Send us your drawings today, and we will gladly quote you actual production figures.

BATCHELDER ENGINEERING CO.
Springfield, Vermont

Use postpaid card. Circle No. 233

Stop Breaking Drill Bits!

WEDGELOCK DRILL STOP



1. Increases life of drill bits
2. Regulates depth of drill hole
3. Cushions the "breakthrough"
4. Prevents chuck from marring surfaces

The Wedgelock Drill Stop consists of two steel end pieces connected by a coil spring. Slips over standard size drills from #50 to 5/16" dia., and is adjusted for required depth simply by tightening set screw. Special sizes available on request.

Wedgelock Clamps and Fasteners

Sheet Metal Clamps
Sets and releases with one hand in one operation. Many styles.

Edgelock Fasteners
Spring actuated. Powerful. Applied with pneumatic or hand pliers.

Speed Bolt Fasteners
Wide variety of holding pins to fit one standard body. Holds up to 250 lbs.

Wing Nut Fasteners
Handles thicknesses up to 2½". Adjustable pressure. Many sizes.

Spring-Actuated Fasteners
Fast alignment of rivet and bolt for lighter materials. Applied with pliers.

Wedgelock makes the greatest variety of fast-action clamps and fasteners in the country. For information on these and other Wedgelock products write—

WEDGELOCK CORPORATION
5446 Satsuma Avenue
North Hollywood, Calif.

Use postpaid card. Circle No. 234

YOU CAN CUT PIN COSTS in HALF!

by Specifying

AUTO-SWAGE

"the automatic swaging method"

Pins and small tubular parts made by Auto-Swage have saved up to 90%, savings of 35 to 65 percent are common. The automatic swaging method reduces metal, rather than cutting it away as by screw machine and eyelet operations, thus eliminating scrap. This factor, added to the high-speed of our special machinery, results in considerable savings to our customers.

Some of the parts we make are: connectors; pins for terminals, radio and fluorescent tubes; guide, shoulder, hinge, stop, and other pins, small eyelet or headed-type parts: shafts, studs, etc.

We also make Beaded Chain and accessories for many uses.

Send sketch, blue-print, or sample for further information on the economy in the automatic swaging method.

AUTO-SWAGE PRODUCTS, INC.
271 CANAL STREET SHELTON, CONN.

Use postpaid card. Circle No. 235

SPECIAL RIVETS
like some of the samples shown here . . . or the more commonly used tubular and split rivets . . . they're all alike to the American Rivet Co. And always—our own special brand of quality and service that gets you what you want when you want it.
THE AMERICAN RIVET CO., Inc.
847 N. Kedzie Ave., Chicago 51, Ill.
Write for price list. For specials, send specifications for prices.
AMERICAN RIVETS
BUY AMERICAN Tubular and Split RIVETS

Use postpaid card. Circle No. 236

assembly and fastener engineering

JULY, 1959

READER SERVICE CARD

Tear out and mail this card!

Please have information sent me on all items I have encircled.

Your Name..... Title.....

Company .....

Address .....

City..... Zone..... State.....

Product Manufactured .....

ADVERTISEMENTS

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What article in this issue interested you most?_____

_____

What subjects would you like to see published in future issues?_____

_____

These Reader Service Cards are for your convenience. They will assist you in getting the additional information you require about any editorial item or advertisement. Because of the speed with which thousands of cards are processed each month it is essential that the blanks be filled in accurately and completely. This will save time and speed the information to you.

Please use only one Reader Service card and let one of your colleagues use the other.

assembly and fastener engineering

JULY, 1959

READER SERVICE CARD

Tear out and mail this card!

Please have information sent me on all items I have encircled.

Your Name..... Title.....

Company .....

Address .....

City..... Zone..... State.....

Product Manufactured .....

ADVERTISEMENTS

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

What article in this issue interested you most?_____

_____

What subjects would you like to see published in future issues?_____

_____

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the U.S.

Postage will be paid by

ASSEMBLY & FASTENER ENGINEERING
A Hitchcock Publication
WHEATON, ILLINOIS

USE THESE HANDY POSTAGE PAID CARDS FOR HELPFUL INFORMATION AND LITERATURE

FIRST CLASS
PERMIT NO. 272
WHEATON, ILLINOIS

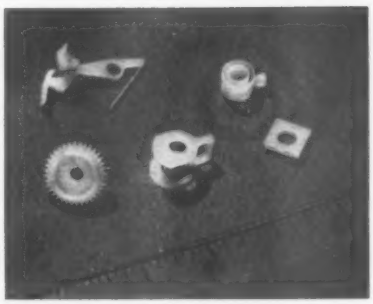
BUSINESS REPLY MAIL
No Postage Stamp Necessary if Mailed in the U.S.

Postage will be paid by

ASSEMBLY & FASTENER ENGINEERING
A Hitchcock Publication
WHEATON, ILLINOIS

WHAT'S NEW IN FASTENERS

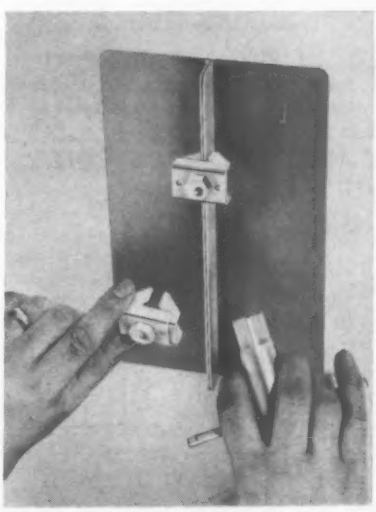
For further information on any of the fasteners listed here, use the handy postpaid card opposite this page.



(See 17)

(See 16)

(See 18)



(See 15)

QUICK ASSEMBLY CLAMP FOR PANEL CONSTRUCTION

A clamp has been specifically designed for quick and easy assembly (and disassembly) of rooms and buildings of flanged-panel construction.

Clamp-Lock is positive-locking, with high closing pressure and tensile strength. Small size and ease of operation permit its use in very limited space. The fastener is secured or opened instantly by a half-turn with 5/8" hex wrench.

The new clamp is available with fastening jaws to fit panels of any thickness. Its fastening range is .025". The part has a closing pressure of 400 lbs., with no deflection; and tensile strength of 700 lbs., with no permanent distortion.

Simmons Fastener Corporation, North Broadway, Albany 1, New York.

Use postpaid card. Circle No. 15

OPEN END ACORN LOCK NUTS OFFER ROUNDED CONTOURS

Prevailing torque lock nuts of open end acorn design are designed for products where rounded contours is desired.

Two stakings in the nut side distort threads slightly to lock the nut to the screw by prevailing torque. The nuts are produced in both steel and aluminum in No. 10, ¼-inch and 5/16-inch sizes.

Russell, Burdsall & Ward Bolt and Nut Co., 100 Midland Ave., Port Chester, New York.

Use postpaid card. Circle No. 16

PLASTIC PARTS RESIST DEFORMATION UNDER STRESS

Production of injection molded tiny plastic parts of Delrin acetal resin is being done in five part-designs.

One of the advantages offered by Delrin is excellent overall "creep" resistance. Steel, of course, exhibits this tendency to resist small amounts of plastic deformation under stress, especially at increased temperatures, to a marked degree, while thermoplastics are said to be deficient in this respect.

Delrin's creep resistance was emphasized in a test where the acetal resin, under prolonged loading at 90% relative humidity and 150°F, exhibited less than half as much creep as all other thermoplastics tested. This quality, plus high strength and stiffness, low permeability and resistance to solvents and corrosion is claimed to enable predictable performance and economies in calculating safety factors.

Gries Reproducer Corp., New Rochelle, New York.

Use postpaid card. Circle No. 17

EXTERNAL SNAP RINGS FOR OUTER RACE SAE BEARINGS

External snap rings for use on the outer race of S.A.E. bearings are held to close tolerances on the inside dimension to provide adequate tension. The gap is designed to permit easy assembly or removal of ring without distortion or damage.

The section is shaped to clear the fillet or radius in the corners of the groove permitting the ring to seat itself properly.

Reliance Div., Eaton Mfg. Co., Massillon, Ohio.

Use postpaid card. Circle No. 18

PLASTIC ACRYLIC CLAMP EASES CABLE SUSPENSION

A plastic device for suspending high voltage power cables—the molded acrylic assembly—simplifies running power cables through dense tree areas.

The easy-open, easy-close Roeclamp is molded in two sections that intermatch. When the matching plastic nut is unlocked and backed off the bolt, the sections pivot open to a fixed position.

In operation, the clamp is fastened through its uppermost opening (narrow end up) to the "messenger" or supporting cable. A sized-to-fit grommet placed over the wire prevents the clamp from slipping or sliding. In running power lines outdoors, the messenger cable is suspended above the conductors (power carrying lines) and bears the weight load of the entire cable suspension system.

Three separate and individual power

(phase) lines or conductors can be carried at one time, each independent of the other. The clamp has three holding positions—each capable of suspending in a locked position a 5 kv rated cable. The Roeclamp requires a clearance of only about one foot in diameter for passing through treed sections.

Chicago Molded Products Corp., 1020 N. Kolmar Ave., Chicago, Ill.

Use postpaid card. Circle No. 19

SELF-DRILLING, STEEL MASONRY ANCHOR

A self-drilling expansion shield has been added to a line of masonry anchoring devices.

Silver King, comes in sizes from 3/16" through ⅞" and in four different types. The product is made of case-hardened steel and zinc plated to retard rust.

Aero Expansion Bolt Co., Marion, O.

Use postpaid card. Circle No. 20

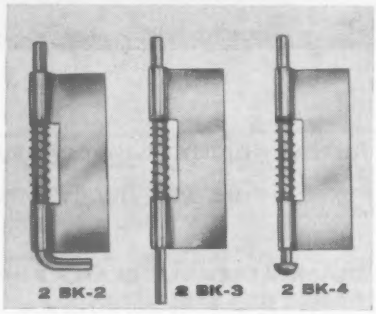
STAINLESS THREADED STOCK

Type "A9" stainless steel threaded stock is available in 12" to 24" lengths, in No. 6 size to ⅜" diameters, with from 32 to 16 threads per inch.

PIC Design Corp., 477 Atlantic Ave., East Rockaway, L.I., N.Y.

Use postpaid card. Circle No. 21

INSTANT RELEASE LATCH HINGE IS MULTI-FITTING



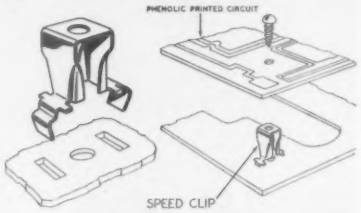
An instant release latch hinge is composed of a housing and pin, with captured spring.

Any hinged part can be taken off or put back at a touch. Strong bearing surfaces provide easy release and action under load. Spring locks part to position when in use. Simple modification of basic unit design provides latch hinge release for wide range of applications.

Burklyn Co., 3429 Glendale Blvd., Los Angeles 39, Calif.

Use postpaid card. Circle No. 22

ONE-PIECE SPRING CLIP FOR PRINTED CIRCUITS



A one-piece clip is designed to serve as a spacer and to fasten printed circuit boards to chassis in electronic equipment.

The speed clip, made of spring steel, is self-retained in fastening position for faster, easier assembly. This is accomplished through the use of its bowed spring legs which snap into place and lock on the underside of the chassis. Once the clips are in place, the circuit board is positioned and screws are inserted, passing through the board and between the spring legs of the clip into the chassis. The clips provide better than ½" clearance between circuit board and chassis.

To prevent the possibility of cracking the brittle phenolic circuit board due to over-torquing of the screws, the clip is designed with a broad, flat head which provides a substantial base at each fastening point.

Tinnerman Products, Inc., Box 6688, Cleveland 1, Ohio.

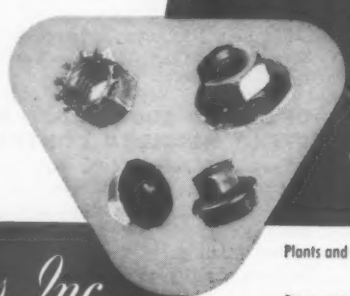
Use postpaid card. Circle No. 23

Reduce Assembly Time

WITH

DUAL-FUNCTION NUT ASSEMBLIES

FROM



- DUAL FUNCTION NUT FASTENERS DESIGNED AND MASS PRODUCED TO ORDER FOR VOLUME USERS — Keps®, Pressed Nuts, Spinlocks, Nut and Washer Assemblies. With or Without Mastic or Plastisol Sealers.
- COMPLETE FASTENER LINE — Screws, Nuts, Clips, Assemblies, Special cold headed products.
- FASTENER ENGINEERING SERVICE — By Anchor's nationally recognized experts.

ANCHOR Fasteners, Inc.

Formerly Connecticut Screw & Rivet Co., Inc.

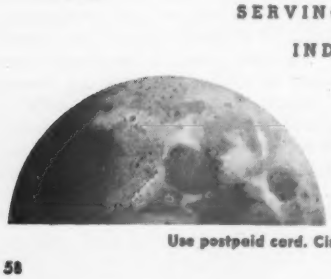
Plants and Offices: Waterbury, Conn. PLaza 6-3617 TWX 165
Cleveland, O. BRoadway 1-6577 TWX CV751

Representative: in New York City • Syracuse • Baltimore Philadelphia • Cleveland • Cincinnati • St. Louis Chicago • Detroit • Fort Wayne

AF-2

Use postpaid card. Circle No. 237

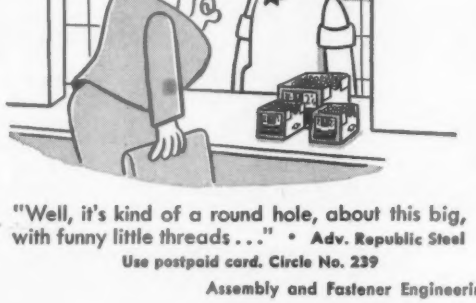
21 YEARS
SERVING THE AVIATION INDUSTRY



BOOTS
AIRCRAFT NUT CORPORATION
NORWALK, CONN.

Use postpaid card. Circle No. 238

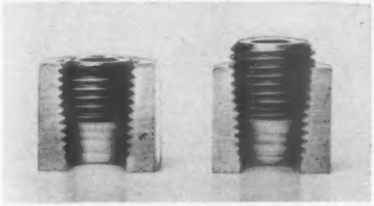
BOLTS 'N NUTS FROM REPUBLIC



"Well, it's kind of a round hole, about this big, with funny little threads . . ." • Adv. Republic Steel

Use postpaid card. Circle No. 239

HEX SOCKET PRESSURE PLUGS ARE FLUSH SEATING



Hex socket pressure plugs, when installed in fluid systems, seat virtually level with the material into which they are threaded.

The Unbrako LevL-Seal also has a different taper from that of the tapped hole—providing leak-proof seal without compound.

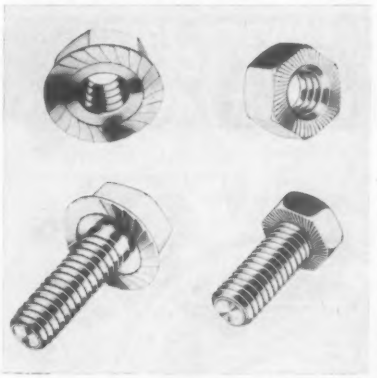
Secret of the plug is in the interference fit resulting from a deliberate interference in taper between the plug and tapped hole. This permits much closer control over point of seating of the plug. Designed for use in standard ¾" per-foot taper tapped holes, the plug has a carefully controlled taper of ⅞" per foot.

All gage measurements are made from the top end, and the plug is designed to seat flush within half a pitch (or turn of thread).

Standard Pressed Steel Co., Jenkintown, Pennsylvania.

Use postpaid card. Circle No. 24

NUT HAS HIGH BOLT TENSION FOR GIVEN TORQUE



A lock nut is said to supply a high bolt tension for given torque and a high release torque compared to application torque.

Whiz-Lock is described as a reuseable, one-piece, free-spinning lock nut. Bearing type with a number of integrally forged, curved, locking teeth, the engineering of which is of such shape, angle and position on a convex bearing surface as to create a lock which requires a much higher wrench torque for release than for application at normal bolt loads.

The company states that the curved shape of the teeth and the convex base enables designers and engineers to safely predetermine torque—and to achieve an excellent torque-tension relationship and lock.

MacLean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill:

Use postpaid card. Circle No. 25

RIFLE MAKER SAVES 86%

with GRC DIE CASTING

Illustrated rifle part die cast in one piece by Gries not only costs 86% less than former 3-piece assembly, but is actually superior—more precise, better looking, with no assembled parts to loosen. By die casting in one piece, and in one automatic operation, substantial savings in time and money are realized. Designs can be simplified to reduce or eliminate machining and assembly. Quick deliveries on quantities of 100,000 to many millions.

NO MINIMUM SIZE!

Maximum length: 1¾"

Maximum weight: ½ oz.

Send today for bulletin.

GRIES WORLD'S FOREMOST PRODUCER OF SMALL DIE CASTINGS

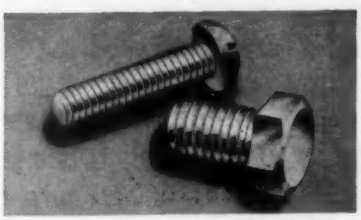
GRIES REPRODUCER CORP.

15 Second St., New Rochelle, N.Y. • NEw Rochelle 3-8600

Use postpaid card. Circle No. 240

Bolts • Nuts
Screws • Washers
Cotter Pins
Taper Pins
Threaded Rod
Mill & Electrical Supplies
Screw Machine Products
All sizes and types

Available in
Stainless
Monel
Silicon Bronze
Brass
Nylon
as well as
Steel



your special Fasteners are our specialty!

No quantity too small
One or 1 million

•

No tolerance too close to handle

•

Emergency and short runs a specialty

•

DELIVERY WITHIN 24 HOURS WHEN REQUIRED

Even in hard-to-get stainless, monel, silicon bronze, brass, steel and nylon . . . because our stocks, our equipment and our staff are specialized. We make the purchasing agent's and the engineering department's job easier. You are assured of quality, dependability and service!

Send for our catalog RIGHT NOW or let us quote on your requirements.

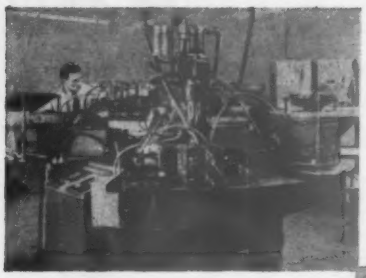
EASTERN STATES SALES CO.

476 U.S. Highway 46 • Hackensack, N.J.

Phone: HUbbard 7-3886 • Baltimore, Md. Phone: BElmont 5-2780

Use postpaid card. Circle No. 241

WHAT'S YOUR ASSEMBLY PROBLEM?



MULTI-STATION ASSEMBLY MACHINES
with interchangeable assembly tools.

SINGLE STATIONS
for established production lines.

FEEDERS
custom designed for any operation.

Multra engineers are prepared to assist you in assembling *your* product automatically. Their wide experience in parts handling and assembly problems will quickly enable them to evaluate your product and advise how it may best be handled.

Multra engineers are qualified to take over completely the design and assembly problems related to automatic assembly of a product and to deliver a machine ready to operate in full production. This may be a complex multi-station assembly machine — it may be a relatively simple 3, 4, or 6-station unit, depending on the particular product — or just an individual tool or feeder for an existing line.

You may prefer to do your own tooling design. In that case, a basic Multra indexing machine, without tools, may be purchased.

Sperry Multra engineers are available for consultation — no charge of course. *Write for technical brochure.*

AUTOMATIC ASSEMBLY . . .
the key to efficient production.

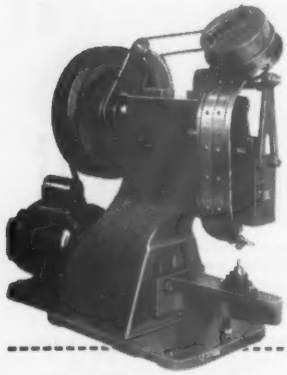
Sperry MULTRA
AUTOMATIC ASSEMBLY

SPERRY PRODUCTS, INC. • 1907 Shelter Rock Rd., Danbury, Conn.
Use postpaid card. Circle No. 242

look into eyelets your FASTENING to solve PROBLEM

Edward Segal | AUTOMATIC EYELETING MACHINERY

single & multiple settings for product improvement and continuing savings



Manufacturers who introduce precision built Edward Segal eyeleting machines to their fastening jobs find they require less handling and production time over other methods—and the machines are complete with no adaptation necessary. Eyelets usually cost much less, and the fastening looks far better.

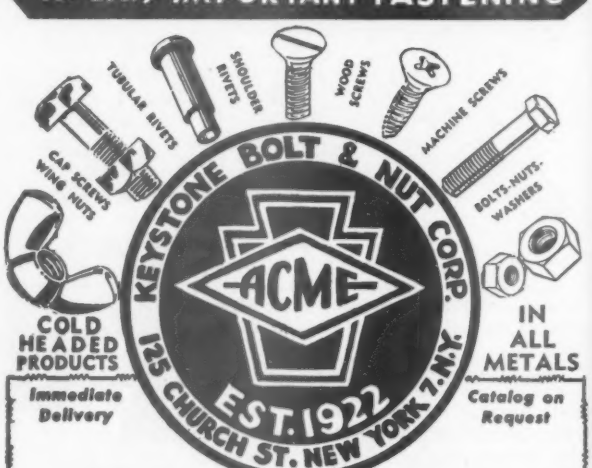
Depending upon your operation, these highly reliable machines can be supplied with varying degrees of automation. Feeding is simplified, and because of the Limited Travel Spindle (pat. pend.), even settings as small as .032" I.D. are possible with a minimum of tool breakage.

Let Segal engineers study your fastening problem without obligation. Write for details to section AFE-7

EDWARD SEGAL • 132 LAFAYETTE STREET, NEW YORK 13, N. Y.
Manufacturers of eyeleting machinery, special hoppers and feeding devices

Use postpaid card. Circle No. 243

THE MOST COMPLETE SOURCE
ON THE EAST COAST
For Every IMPORTANT FASTENING



COLD HEADED PRODUCTS
Immediate Delivery

IN ALL METALS
Catalog on Request

When the chips are down "KEYSTONE" is your best bet to solve all your fastener problems. We Maintain the Largest Stock of BOLTS, NUTS, SCREWS, RIVETS & WASHERS in different metals, sizes and types, on the east coast. You're sure to find them here! And we will get them to you fast.

SPECIALS TO BLUEPRINT SPECIFICATIONS

KEYSTONE BOLT & NUT CORP.

125-A CHURCH STREET WO 4-4600 NEW YORK 7, N.Y.
SALES & WAREHOUSE 919 5th AVE. SOUTH NASHVILLE, TENN.
MANUFACTURING BRANCH BRISTOL, CONN.

Use postpaid card. Circle No. 244

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 56.

WELDING FASTENERS

Thirty-five stock welding parts are illustrated with a brief description of individual use in eight-page Bulletin 583. Hundreds of possible applications listed by industries with illustrations and design tips. The Ohio Nut & Bolt Co., 33 First Ave., Berea, Ohio.

Use postpaid card. Circle No. 30

AIRCRAFT-QUALITY PARTS

Complete facilities for making precision screw machine products are pictured and described in an attractive 10-page brochure. Aircraft-quality bolts in large volume are produced. Question-and-answer method outlines capacities. Machines available listed. Precision Products Div., The New Britain Machine Co., New Britain, Conn.

Use postpaid card. Circle No. 31

RETAINING RING STANDARDS

A series of retaining ring reference sheets converts National Aircraft Standards to industrial numbers. Data becomes helpful when specifying, ordering parts. Industrial Retaining Ring Co., 57 Cordier St., Irvington 11, N. J.

Use postpaid card. Circle No. 32

THREAD FIT CHECKLIST

"Common thread fit problems, their symptoms and detection," is a handy pocket-sized check list. The solve-it-yourself chart describes typical fastener misfits, lists possible causes of each, gives methods of detection and the accuracy of each detection method. Standard Pressed Steel, Jenkintown, Pa.

Use postpaid card. Circle No. 33

RUBBER-DIPPED CLAMPS

Form-dipped rubber parts—including clips, clamps, grommets—are presented in four-page Bulletin 63055. Various insulating compounds are available. Typical applications in automotive, aircraft, electrical, machine tool industries illustrated. Automotive Rubber Co., Inc., 12550 Beech Rd., Detroit 39, Mich.

Use postpaid card. Circle No. 34

DESIGN FOR AUTOMATION

Bulletin 601 presents means of justifying automatic assembly in spite of low production rates. Methods of tooling machines to produce multiple assemblies and ways of redesigning machines discussed. Eight pages of drawings and photos illustrate multi-purpose work nests, standard fixtures, close-ups of operating stations. Ferguson Machine Corp., 7818 Maplewood Industrial Ct., St. Louis 17, Mo.

Use postpaid card. Circle No. 35

FILLISTER HEAD SCREWS

"AN" drilled fillister head machine screws are specified in Price List No. 250. Length, diameter, materials are given in price-per-thousand form. Aircraft Quality Fasteners, Inc., 308 Clarkson Ave., Brooklyn 26, N.Y.

Use postpaid card. Circle No. 36

HIGH TENSILE STEEL WELDS

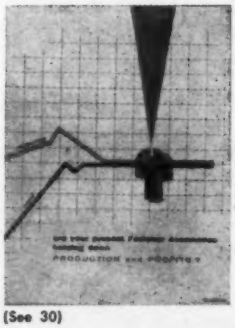
The "a,b,c's" of welding high tensile steels are explained in an eight-page booklet. Using question and answer style, electrode design, materials, preheating and temperatures are discussed. Arcos Corp., 1502 S. 50th St., Philadelphia 43, Pennsylvania.

Use postpaid card. Circle No. 37

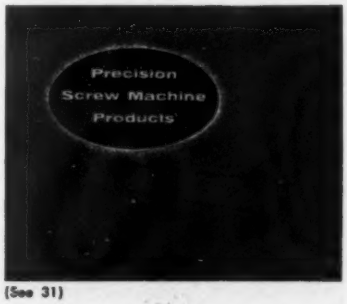
BRAZED SANDWICH

A brazed honeycomb sandwich construction for structural use which withstands operational temperatures up to 1200°F has been developed for the Air Force, according to a report just released for industry use through the Office of Technical Services, U.S. Department of Commerce.

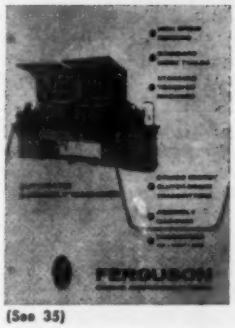
The successful base-braze metal combination was type A-286 steel, an



(See 30)



(See 31)

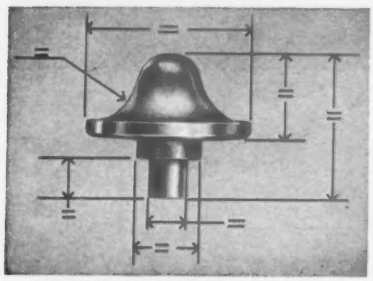


(See 35)

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

Manufacturers of Cold Headed Fasteners Since 1888

OVER 10 TIMES THE RATE AT 50% SAVING IN RAW MATERIAL



Another example of how Hubbell Cold Heading produces Better Parts at Faster Speeds, at Lower Cost

THE PART:
Click Button

THE MATERIAL:
Brass

THE METHOD:
Hubbell cold heading in place of screw machining.

THE RESULT:
This brass click button was machined previously from bar stock, involving several different operations that removed nearly 50% of the total weight of the original stock . . . a wasteful, time-consuming, costly process.

Hubbell now produces essentially the same part at tremendous savings in time and material cost.

a. Production is increased from the original rate of 5.5 pcs. p.m. to cold heading rate of 60 pcs. p.m.

b. Labor, overhead and material cost has been reduced 36%.

c. The finished part is stronger, more accurate, with greater uniformity.

Hubbell Cold Heading may provide equally dramatic results for you. Whether it is presently cold headed or not, send blueprint of part or sample for analysis and estimate.

HARVEY HUBBELL, Inc. *Machine Screw Dept.*
Bridgeport 2, Connecticut

Kindly estimate on the enclosed sample (blueprint) Quantity _____

Name _____

Title _____

Company _____

Address _____

Use postpaid card. Circle No. 243

austenitic super alloy containing titanium and aluminum, brazed with a nickel-chromium-silicon-iron-boron alloy.

The report, PB 151272 "Development of Brazed Sandwich Construction Materials for High Temperature Applications," C. F. Burrows and F. J. Ragland, Jr., The Martin Co. for Wright Air Development Center, U.S. Air Force, July 1958, may be ordered from OTS, U.S. Department of Commerce, Washington 25. It contains 105 pages, price $2.50.

Use postpaid card. Circle No. 38

LOCKING TERMINALS

Terminals with built-in lock washers for use in the electronic and electrical industries are featured in a well-laid-out 24-page catalog. The complete line of 26 plain and locking terminals is specified, Shakeproof, St. Charles Rd., Elgin, Illinois.

Use postpaid card. Circle No. 39

INSULATING SCREW

Test reports point out torque and shear comparisons between a plastic screw with metal core vs. all-nylon screws. Four-page data sheet lists typical applications of the Insul-Screw. Samples. Austin Screw Products Co., 4873 W. Armitage Ave., Chicago 39, Ill.

Use postpaid card. Circle No. 40

SPECIAL SHAPED FASTENERS

Headed and threaded rods, bolts, studs and specially shaped fasteners are pictured with specifications in four-page Bulletin 650. Hook and spade bolts, U-bolts, eye bolts are shown. Rods can be bent to any shape. Ohio Rod Products Co., Inc., 20251 First Ave., Berea, Ohio.

Use postpaid card. Circle No. 41

COMPONENTS FABRICATING

Engineering facilities for fabricating components—especially for the missile and atomic industries—are outlined by text and photographs in a four-page brochure. Welding, tool design, testing are among the services offered. Research Welding & Engineering Co., Inc., 18201 S. Santa Fe Ave., Compton, Calif.

Use postpaid card. Circle No. 42

COLD FINISHED STEEL

Facilities which produce cold finished steel in six shapes daily are pictured, as well as a fastener line. The eight-page booklet gives specifications for coiled straightened and cut lengths of wire. Spring washers, bolts and screws, snap rings, hose clamps illustrated. Reliance Div., Eaton Mfg. Co., 605 Charles Ave., Massillon, Ohio.

Use postpaid card. Circle No. 43

3000 RETAINING RINGS

Price lists for single and two-turn wound Spirolox rings and stamped Circolox rings are offered. Over 3000 sizes and types are cataloged, ranging from ½" to 10" in diameter. Instructions for pricing specials without calling or writing are given. Ramsey Corp., Box 513, St. Louis 66, Mo.

Use postpaid card. Circle No. 44

STANDARDS MANUAL

An indexed manual gives standards for lines of blind bolts and nuts, aircraft bolts and rivets. Identification chart facilitates reference. Step-by-step installation drawings handy. Loose-leaf pages. Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.

Use postpaid card. Circle No. 45

BRAZING CEMENT

Cement used in applying brazing alloys for high-temperature service is covered in a two-page engineering data sheet (No. 7). Composition, properties and, uses suppliment handy chart showing approximate Zahn viscosity numbers for six different thicknesses of Nicrobraz cement. Stainless Processing Div., Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich.

Use postpaid card. Circle No. 46

NEW FASTENING MATERIAL

How tough, new "Delrin" acetal resin can be used both as a fastening material and as primary material for product fabrication is explained in 12-page report and accompanying house publication. Methods of fastening, properties, field tests, typical applications are shown through diagrams, charts, photos and text. E. I. duPont de Nemours & Co. (Inc.), 12096 duPont Bldg., Wilmington 98, Del.

Use postpaid card. Circle No. 47

AIRCRAFT NUTS

How special nuts for the aircraft and other industries are precision milled and formed is described in a four-page brochure. AN 6-digit nuts available for quick delivery listed. Small quantity orders welcomed. Precision Nut Co., 2567 Beaufait, Detroit 7, Mich.

Use postpaid card. Circle No. 48

LOCKING NUTS-WASHERS

Close-tolerance bearing locknuts and lockwashers are specified in an attractive four-page data sheet. Machined to SAE, ABEC and ASA B3.9 standards, the ball and roller bearing parts are illustrated and charted with complete dimensions. Weslok Corp., 182 W. Holt Ave., Milwaukee 7, Wis.

Use postpaid card. Circle No. 49

RUST RESISTANCE DATA

Laboratory data on the corrosion resistance of various types of stainless steels to various chemicals and corrosive media is listed in table form. Catalog 29-A presents over 7000 types of stock stainless steel fasteners, including new AN & MS parts. Star Stainless Screw Co., 655 Union Blvd., Paterson 2, N. J.

Use postpaid card. Circle No. 50

APPLIANCE HOSE CLAMP

A hose clamp for low pressure appliance applications is described in a four-page, loose-leaf brochure. The single-lug, mechanical-lock circle clamp's features are illustrated in step-by-step installation photos. Cuyahoga Products Corp., 10252 Berea Rd., Cleveland, Ohio.

Use postpaid card. Circle No. 51

STUD WELDING REPORT

Laboratory tests measuring the load capacity, fatigue and static strength of stud shear connectors used in bridge and building construction are published in two bulletins. Dr. Bruno Thurlimann of Lehigh University conducted the experiments. Text, diagrams, photographs reveal methods and results. KSM Products, Inc., Yale and Woodland Ave., Merchantville, N. J.

Use postpaid card. Circle No. 52

AN, MS PARTS LISTING

A clear and complete listing of available AN and MS fasteners (over 70 different specifications) is featured in an eight-page catalog. Bolts, screws, studs, nuts, rivets, washers and pins are among the 50 million parts stocked. Albany Products Co., Inc., 351 Connecticut Ave., South Norwalk, Conn.

Use postpaid card. Circle No. 53

SOLDERING IRONS

A complete line of American Beauty soldering irons, including angle-type casing irons and bantam models, are specified in a pocket-sized folder. Cutaway drawing points out component features. Recommended uses for various models accompanies specification table. Copper tips and temperature regulating stand also described. American Electrical Heater Co., 6110 Cass Ave., Detroit 2, Michigan.

Use postpaid card. Circle No. 54

TORQUE MULTIPLIERS

A seven-tool line of torque multipliers with ratios from 3:1 to 31:1 is shown and described in four-page bulletin B-AST. Other products introduced are torque testers, line clamp pliers, and tow bars. Principles explained. B. K. Sweeney Mfg. Co., 6400 E. 44th Ave., Denver 16, Colo.

Use postpaid card. Circle No. 55

PRE-ASSEMBLED FASTENERS

Pre-assembled nuts and lock washers have six time and cost saving features, which are pointed out in a four-page brochure. A new hex nut with cupped-type washer (Tenz-Nut) and a hex nut with tooth-type washer (Kep) are illustrated and specified. Reliance Div., Eaton Mfg. Co., Massillon, Ohio.

Use postpaid card. Circle No. 56

RIVET STANDARDS CHART

"Dimensional Standards for Semi-tubular Rivets" is said to contain information not available from any other source. The hard-fibre chart contains data on all major classes of semi-tubular rivets, including body and head diameters, head thicknesses and radii, hole diameter and depth figures. Tubular and Split Rivet Council, 53 Park Pl., New York 7, N. Y.

Use postpaid card. Circle No. 57

PILOT-WELD NUTS

General line of weld nuts (piloted, floating types), clinch nuts, clips and small stampings are treated in a 16-page catalog. Standards and specifications of each type are accompanied by dimensional drawings and photograph. Uses in the automotive, appliance and aircraft industries suggested. The McLaughlin Co., 212 Jaikins Bldg., Birmingham, Michigan.

Use postpaid card. Circle No. 58

1000 RIVETS PER HOUR

Two types of blind rivets—pull through and self-plugging—are presented in two-color, eight-page Form 8-409. Production speeds up to 1000 rivets per hour are possible. Diagrams and text give typical applications, shop practice notes, hole sizes and material specifications, shear and tension values. Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Michigan.

Use postpaid card. Circle No. 59

ADDED-POWER WRENCH

A heavy duty ½" drive electric wrench has been equipped with 25% added power. Description of Size 5U-HD model and two other ½" Impactools —the standard duty and automatic torque control model—are given in four-page Bulletin PL-5252. Rated capacities for each type of operation charted. Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

Use postpaid card. Circle No. 60

LOCTITE secures 98 studs against vibration

Locking studs with Loctite Liquid Sealant in transmission unit of jet aircraft starter.

Cast aluminum gear cases for jet aircraft starters are machined and assembled at The Black Rock Manufacturing Company, successor to Reed-Prentice Corp., Bridgeport, Connecticut. The 98 studs used in the unit are treated with LOCTITE Sealant to secure them against vibration. The jet starter units receive an input of 2500 rpm and develop output of 5000 rpm to each of three flexible shaft connections. LOCTITE was selected for this application since it provides a greater prevailing torque than any mechanical locking device. The locking strength of LOCTITE is not affected by the wide temperature ranges the unit encounters in arctic to tropic operation.

Stud thread is hand-dipped in shallow tray of Loctite, then positioned in casting for tightening. Three sizes of steel studs are used: ¼"-20, ⅜"- 18 and ½"-16.

Two ½"-14 thread inserts are treated with Loctite to lock and seal in casting. The inserts provide non-abrading threads for removable oil-drain plug.

LOCTITE Sealant is a thin liquid that hardens into a tough heat and oil-resistant plastic bond when confined between closely fitting metal parts. No amount of vibration will shake loose a LOCTITE treated threaded fastener, yet ordinary tools may be used to remove the part. LOCTITE is used to hold bearings, bushings, or hardened sleeves to shafts without press fit; seals joints against high pressure fluids. Write for literature and free sample.

LOCTITE® SEALANT
AMERICAN SEALANTS COMPANY
135 Woodbine St., Hartford 6, Conn.

Use postpaid card. Circle No. 246

Your fastener problems will be eliminated when you do business with Detroit Bolt and Nut Company. We maintain in stock over 250,000 different sizes and types of bolts, nuts, screws and washers. Our trained sales personnel is ready to serve you.

Immediate shipments from stock. Write for our new catalog.

DETROIT BOLT & NUT COMPANY
4520 MAYBURY GRAND
DETROIT 8, MICHIGAN
TYler 4-3420

Use postpaid card. Circle No. 247

New . . . Revolutionary

BLIND FASTENER with THREADS

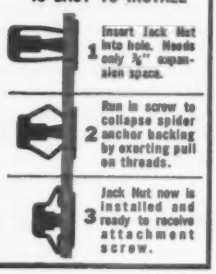
MOLLY JACK NUT

The ONLY Blind Fastener Which Grips ANY Material From 0" to 3/16" Thick

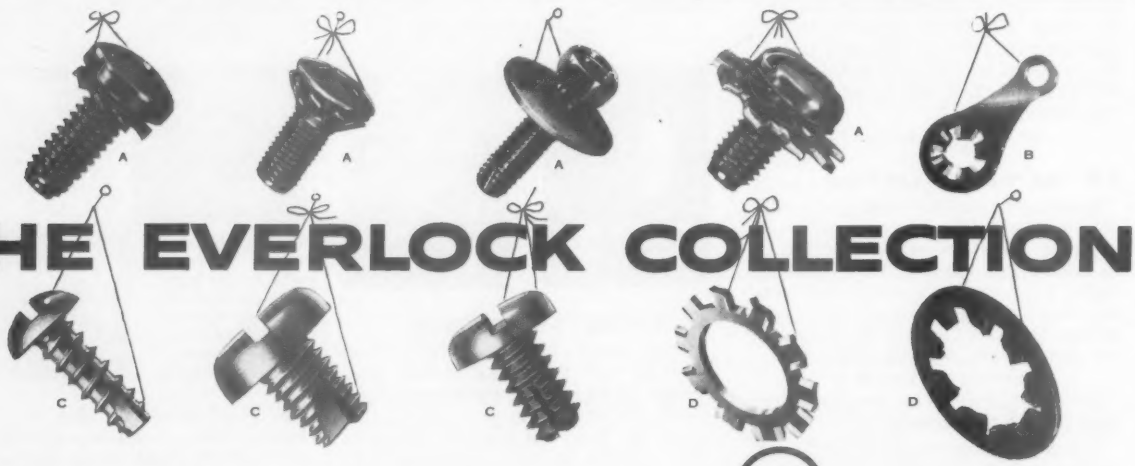
Ask Your Industrial Distributor or Write for FREE Brochure

MOLLY CORP.
230J N. 5th St., Reading, Pa.

MOLLY JACK NUT IS EASY TO INSTALL


1 Insert Jack Nut into hole. Needs only 3/8" expansion space.
2 Run in screw to collapse spider anchor backing by exerting pull on threads.
3 Jack Nut now is installed and ready to receive attachment screw.

Use postpaid card. Circle No. 248



THE EVERLOCK COLLECTION

NOW MORE EXTENSIVE THAN EVER—OUR COMPLETE LINE OF INDUSTRIAL FASTENERS AND COLD-HEADED SPECIALTIES

These are just a few of the many Everlock industrial fasteners used consistently by leading automotive, appliance and other metalworking manufacturers—some of them our customers since 1918. When you buy Everlock fasteners, you deal with one of the few completely integrated manufacturers of lock washers, Sems, thread-cutting screws, terminals and cold-headed specialties. We are prepared to deliver on short notice a complete line of competitively priced, top quality washers from stock in our plant or your local distributor's warehouse. Talk to your local Everlock representative for expert assistance with fastener problems or use the coupon to send for samples and our current catalog. Blueprints welcome! Let us quote on any of your fastener needs.

A. Sems—Available with any style head, thread, washer and point. **B. Terminals**—Tooth-type locking or plain. **C. Thread-Cutting Screws**—Type 1, 23 and 25. **D. Lock Washers**—Tooth-type lock available in internal, external, countersunk, combination internal-external, dish-type, and dome washers. Also Belleville or serrated Belleville.

AMF Everlock INDUSTRIAL FASTENERS

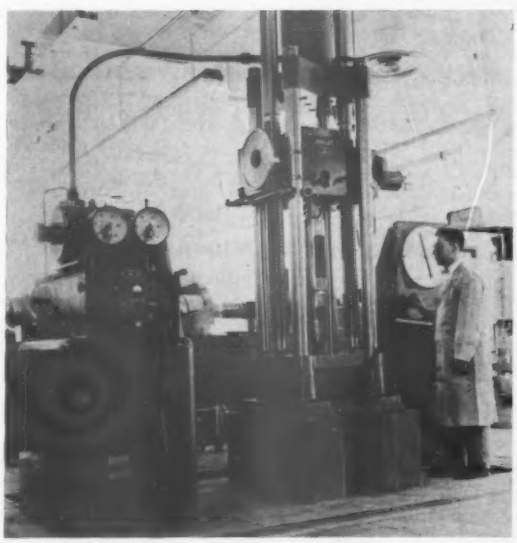
Thompson-Bremer & Company
Division of
American Machine & Foundry Co.

Thompson-Bremer & Co., 228 N. LaSalle Street, Chicago 1, Ill
Please send me: AFE-7
_____ Everlock fastener catalog _____ samples of Everlock industrial fasteners and cold-headed specialties.
Name_____Title_____
Company_____
Street_____
City_____Zone____State_____

Use postpaid card. Circle No. 249

INDUSTRY MAKES NEWS

Actress Greta Thyssen introduces new Eutectic Welding Alloys cartoon symbol.



New SPS bolt testing machine consists of a tensile testing console (right), loading tower and fatigue test station (right).

SPS ADDS MUSCLE FOR BIGGER BOLTS

Giant 250,000 lb. Amsler testing machine just installed by Standard Pressed Steel Co., Jenkintown, Pa., will make available for the first time certified fatigue test data on all standard sizes of high-strength aircraft and industrial bolts. This includes 260,000 psi fasteners.

Capable of exerting a repetitive fatigue load of 250,000 lbs. 500 times a minute, the unit has twice the capacity of the 132,000 lb. Schenck testing machine installed by SPS earlier this year.

Part of an SPS Laboratories' study on larger-diameter, higher-strength threaded fasteners, the unusual dual-purpose machine can also perform static tensile tests to its full capacity.

"LITTLE HUGH-TEC" JOINS WELDING WORLD

Greta Thyssen, stage, screen and TV star, and Miss Weldor of 1959, would like to have you meet "Little Hugh-Tec". He is a new symbol created by the famous French poster artist Savignac especially for Eutectic Welding Alloys Corp. of Flushing, N.Y.

The new character will be promoted in the company's trade and business advertising.

LOCKNUT INVENTOR HONORED BY S.A.W.E.

Kenneth Reiner, president of the Kaynar Mfg. Co., Inc. of Los Angeles, was named recipient of the top award for outstanding achievement in weight optimization, presented by the Society of Aeronautical Weight Engineers, at its 18th annual meeting, held in Atlanta, Georgia.

Forty-three-year old Reiner, who is the inventor of the Kaylock lightweight, self-locking nut, was granted the award for individual, outstanding accomplishments in the application of light-weight design principles in the field of fasteners.

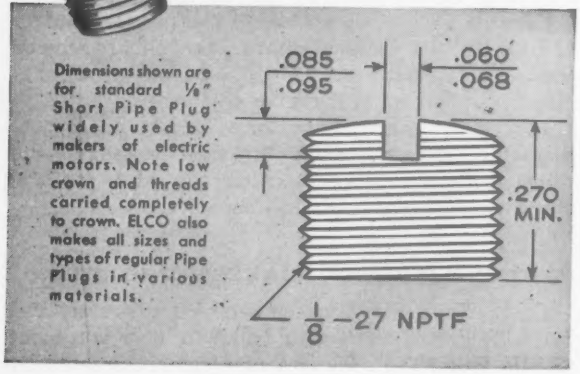
The award was presented by E. Joseph Weber of Baltimore, Md., official of the Martin Aircraft Co. and chairman of the award committee.

In presenting the plaque, Weber pointed out that Reiner's achievement is considered outstanding and commendable by the Society's awards committee be-

continued

SHORT PIPE PLUGS

ELCO



Dimensions shown are for standard ⅛" Short Pipe Plug widely used by makers of electric motors. Note low crown and threads carried completely to crown. ELCO also makes all sizes and types of regular Pipe Plugs in various materials.

NOW MANUFACTURED BY COLD HEADING PROCESS

The advantages of the cold heading process have now been adapted to the production of ⅛" Short Pipe Plugs, formerly made only by another method. Cold heading produces a stronger plug, of uniform strength throughout.

LOWER COSTS! COMPARE!

Cold heading also brings lower costs. Get our prices — compare with your present source! Another important feature — Elco Pipe Plugs are made with the "Dry-Seal" thread that eliminates sealing compounds and, when properly mated, will not leak at pressures up to 250 psi.

Write for full information

"ELCO SCREWS ARE GOOD SCREWS"

ELCO TOOL AND SCREW CORPORATION

1101 SAMUELSON ROAD, ROCKFORD, ILLINOIS

Use postpaid card. Circle No. 250

cause of the impact his creativity has had on all components of an airborne system, resulting in noticeable and substantial weight savings and improvements of efficiency.

Reiner, a Purdue University engineering graduate, is the first person to receive the S.A.W.E. Optimization Award. The international society is composed of 1200 United States, Canadian and foreign country weights engineers.

MC LAUGHLIN NAMES CHIEF ENGINEER

Gardner D. Carpenter has joined The McLaughlin Company as chief engineer. Carpenter has been in fastening engineering work for over 20 years. Most of the experience was gained with Mt. Clemens Metal Products Co. engineering assignments for Ford, Fisher Body Division of General Motors, and Chrysler.

NEW ENGIN. MGR. AT DODGE ASSEMBLY

John C. Trent has been named manager of industrial engineering at the Dodge Assembly Plant, plant manager Joseph B. Neal announced today. Before joining Dodge recently, Trent held supervisory posts with other major automotive companies for the past 14 years.

MILLER NAMED GEN. MGR. AT RELIANCE DIV.

Paul A. Miller has been appointed general manager of the Reliance Division of Eaton Mfg. Co. in Massillon, Ohio. Miller succeeds C. A. Sellen who will become head of the Division's expanded steel sales program.

Miller moves into the post at Reliance from his most recent position as general manufacturing manager of the Hardware and Accessories Division of Ford Motor Company at Rawsonville, Mich. Before joining Ford Motor, he was associated for 20 years with the Leece-Neville Co., Cleveland, advancing to become vice president—manufacturing.

DE ZEMPLEN NEW ANTI-CORROSIVE DIV. MGR.

Max De Zemplen has joined Anti-Corrosive Metal Products Co., Inc., Castleton-on-Hudson, N.Y. as Los Angeles division manager. He was formerly general sales manager of the Briles Mfg. Co. and Voi-Shan Mfg. Co.

New St. Louis representative is John W. Bresnahan, proprietor of the Pem Sales Co. of University City, Mo.

SELLIN ELECTED V-P AT MIDLAND SCREW

Robert Sellin has been elected to the office of vice president, Midland Screw Corp., Chicago. Sellin's previous position was manager of Midland's Los Angeles plant. He will return to the general offices in Chicago in July.

Robert Schultz has been promoted to plant manager, Los Angeles.

CHICAGO PNEUMATIC BUYS REICH BROS.

The Chicago Pneumatic Tool Co. has purchased the assets of the Reich Bros. Mfg. Co., Inc. of Terre Haute, Ind., producers of hydraulic rotary blast hole drills and drilling rigs. The purchase also includes Reichdrill Mfg. Co., Ltd., Glasgow, Scotland.

The present personnel of the acquired organization, which will be called the Reichdrill Division of the Chicago Pneumatic Tool Co., will continue in present capacities.

FASTENERS & ADHESIVES—Harry W. Rose, general manager of Simmons Fastener Corp. (right) and Robert R. Moore of Eastman Chemical Products (left) discuss the possibility of using a new rapid-setting adhesive in assembling a high-loading Simmons fastener. Eastman 910 and Simmons products were both exhibited at the Design Engineering Show in Philadelphia where this meeting occurred.

TOWNSEND SELLS ALL WIRE-FORMING EQUIP.

Acme Stamping and Mfg. Co. of Pittsburgh has acquired the wire-forming facilities of Townsend Co., New Brighton, Pa. According to R. L. Schrei, Acme president, all equipment, tools, dies and drawings has been transferred to the Acme Pittsburgh plant.

BRANNIGAN JOINS J. L. THOMSON SALES

Walter J. Brannigan, formerly associated with an international precious metals firm, has joined the sales department of the Judson L. Thomson Mfg. Co., Electrical Contacts Division, Waltham, Mass. He will make his headquarters at the Chicago office.

SALES CHANGES AT DENISON ENGINEERING

Two changes in the sales department of Denison Engineering Div., American Brake Shoe Co., Columbus, Ohio, have been announced. John P. Sharp will be regional product sales manager in the Eastern Sales area and Bruce R. Horne will handle hydraulic components sales from the home office.

ALCOA SCREW MACHINE STOCK SALES MGR.

Robert J. Ogden has been appointed manager of screw machine stock sales for Aluminum Company of America.

Ogden will coordinate the company's expanding sales and service policies with screw machine stock customers. The activity is geared to recommend correct aluminum alloys for specific applications.

A native of Battle Creek, Mich., Ogden joined Alcoa in 1946, and served for more than six years in the Detroit sales office. Since 1953, he has been assigned to the Grand Rapids sales office.

SCREW MACHINE ASSOC. MEETS AUG. 19-20

The National Screw Machine Products Association announced its third biennial sales conference for member company sales personnel. The conference is scheduled for Cleveland's Wade Park Manor Hotel, August 19 and 20.

The 1959 conference will include talks by Dr. G. Herbert True, director of creativity research, Visual Research Inc.; Fred Smith, head of his own business brokerage and management consultant firm; Erwin K. Taylor, president, Per-

continued

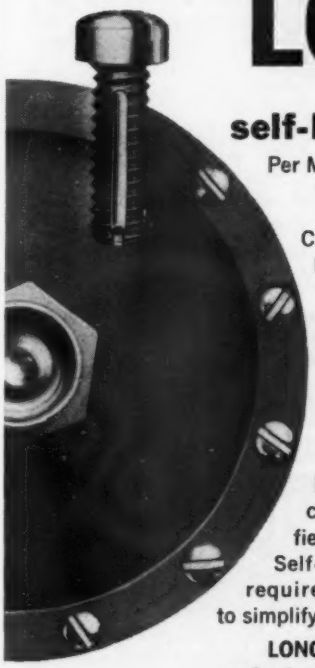
eliminate safety wire

on airborne accessories with...

LONG-LOK

self-locking screws

Per MIL-F-18240



Critical **weights** and needless and costly man-hours of **assembly time** are being saved through the use of **LONG-LOK** Self-Locking Screws on pressure switches, motors, pumps, valves and other airborne accessories.

Many companies in the aircraft, missile and rocket fields are using **LONG-LOK** Self-Locking Screws per the requirements of MIL-F-18240 to simplify their assemblies.

LONG-LOK Self-Locking Screws are heat, vibration, shock and impact resistant. They are reuseable and can be head marked for self-lock identification per specification. Increased reliability of component **and** system is assured.

LONG-LOK Self-Locking Screws are solving new fastener problems every day. They could be the answer to your needs.

Write for Catalog LL-59.

LONG-LOK CORPORATION

2601 COLORADO AVENUE • SANTA MONICA, CALIFORNIA

Use postpaid card. Circle No. 251

LOCKING KEY FREES BOTH HANDS: Pushing the locking key forward automatically locks the jaws. Jaws released instantly by pulling back on the locking key.

New multi-purpose tool to pick up and grasp small parts for soldering or other operations; as a vise to free both hands; to secure rivets; to cut small wire; to strip insulation; as a brad or staple setter.

ONE HAND ACTION: Quick one-hand adjustment for size and lock-up leaves the other hand entirely free.

No. 800 .....$4.50

Multi-Purpose Tool serves as:

(1) Plier
(2) Vise
(3) Wire Cutter
(4) Stripper
(5) Crimper
(6) Tweezer
(7) Wrench
(8) Heat Sink

New Catalog of X-ACTO PRECISION HAND TOOLS for INDUSTRY. FREE on request.

At your ELECTRONIC PARTS JOBBER or order direct.

HANDICRAFT TOOLS, INC.
a division of **X-ACTO, INC.**
48-87 Van Dam St., L.I.C. 1, N.Y.

Use postpaid card. Circle No. 252

LOK-THRED • LOK-THRED • LOK-THRED

MIN·O·DEE* THREAD INSERTS

*(Minimum outside diameter)

TO REPAIR DAMAGED THREADS

Saves expensive castings, easily, economically. Uses standard drills and drivers.

TO PROTECT INTERNAL THREADS

Prevents wear on soft metal threads. Permits use of inexpensive cap screws. Inserts won't loosen. Easily removed with standard "ease-out" tool without damage to casting.

TO STRENGTHEN ASSEMBLIES

Vibration proof inserts give maximum holding power. Saves expensive casting material. Permits smaller bosses. Grips firmly over entire thread length.

(Send for complete technical details.)

LOCK THREAD CORPORATION, 2832 E. Grand Blvd., Detroit 11, Mich.

Use postpaid card. Circle No. 253

sonnel Research and Development Corp., and A. M. Kennedy, Jr., general manager purchases and traffic, Westinghouse Electric Corp.

NEW VOI-SHAN PLANT AIDS EFFICIENCY

By consolidating its manufacturing into a single facility, Voi-Shan Mfg. Co., Division of Voi-Shan Industries, Inc. estimates a considerable increase in efficiency, the company reports.

Previously spread out over some six locations in the area, Voi-Shan's manufacturing and associated departments have been collected into a single plant, located on Easthan Road, Culver City. The building was expanded 42,000 sq. feet over its original 30,000 sq. feet.

SALES EXECUTIVE PROMOTIONS AT AS&W

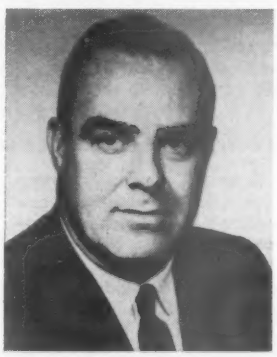
Boyd P. Doty, Jr. is now operating in the post of general sales manager for American Steel & Wire. He succeeded the recently retired Howard B. Maguire. Doty previously held the post of Cleveland district sales manager for U.S. Steel.

Two created executive sales positions were filled by M. E. Capouch as manager of distribution and availability and William H. Guterl as manager of marketing.

BLACK & WEBSTER MOVES TO NEW SITE

Black & Webster, Inc., Newton, Mass. and three affiliates, Edward Blake Co., Inc., Black & Webster Sales, Inc., and Nylogrip Products, was moved to new quarters at 570 Pleasant St., Watertown, Mass.

ANGUS JOINS RUBBER & ASBESTOS SALES



William A. Angus has joined Rubber & Asbestos Corp., Bloomfield, N.J., as vice president-sales, a newly established executive position in the company's marketing structure.

Angus has been associated with the adhesives and plastics industries for over 12 years: formerly, as eastern regional sales manager for Minnesota Mining & Mfg. Co., and, most recently, as head of his own organization representing manufacturers in the fields of compounded products and electronic components.

ATLAS SCREW & SPECIALTY CO. EXPANDS

Milton Jacobs, president of Atlas Screw & Specialty Co., New York City, announced that the company's branch in Newark, N.J. has just completed moving to new and larger quarters at 396 Jelliff Ave. A. Bell has been named plant superintendent.

TRIPLEX ADDS TO SALES FIELD STAFF

Five appointments to the Triplex Screw Co. sales staff, were announced by T. S. Gulyas, general sales manager, from Cleveland land headquarters. Two new sales representatives to the railroads are John H. Van Moss Assoc. in Chicago and Bowman Supply Co. in Cleveland. Linn Durbin in Virginia, North and South Carolina; George Stauffer, Del. and Eastern Pa. and W. G. Smith, Elyria, Ohio, are new salesmen.

Index to Products Advertised

Assembly machines, 20, 60

Assembly tools, 12, 16, 18, 52, 68, 70

Bolts, 43, 58, 60, 64, 4th Cover

Clamps, 56

Cold heading equipment, 27

Drill stops, 56

Eyeletting machinery, 60

Fasteners
- Aircraft, 42, 46, 58, 67
- Blind, 64
- Cold-headed, 17, 58, 62, 64
- Corrosion-resistant, 59
- Special, 3, 4, 9, 58, 59, 76
- Weld, 32, 33, 55

Feeders, parts, 55, 60

Inserts, threaded, 34, 68

Latches, 21, 48

Machines, drilling & tapping, 55

Nuts
- Clinch, 55
- Lock, 42, 58, 69
- Special, 9, 58, 64
- Wing, 60, 76

Parts, cold-headed, 9, 52, 58, 60, 62, 64, 66

Parts, die cast, 59

Parts, swaged, 56

Pins, locking, 14, 56, 59

Plugs, 66

Plungers, spring, 18

Retaining rings, 10, 54

Rivets, 6, 56, 60

Sealants, 63

Screwdrivers, manual, 70

Screws
- Cap, 17, 40 A-F
- Machine, 60, 64, 4th Cover
- Phillips, 36
- Self-locking, 63
- Self-tapping, 64, 4th Cover
- Set, 17, 40 A-F, 64
- Socket, 46, 47, 64, 3rd Cover
- Standard, 4, 12, 16, 60, 4th C.

Sockets, 13

Spring wire, 35

Terminals, 64

Washers
- Lock, 2, 64
- Self-sealing, 8, 58
- Special, 2

Wire drawing units, 27

Wrenches, torque, 52

Services, problem analysis, 4, 52, 59, 60, 2nd Cover

Quarterly Index of Articles

APRIL

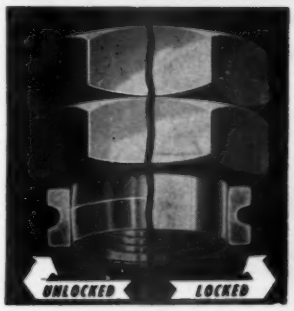
Building a Reliable, Low Cost Adding Machine.....22
Unusual Air Conditioner Assembly Techniques 28
Air Tools Prepare Tubing for Brazing 37
Automatic Set Screw Insertion 41
The Function of Quarter-Turn Fasteners 45

MAY

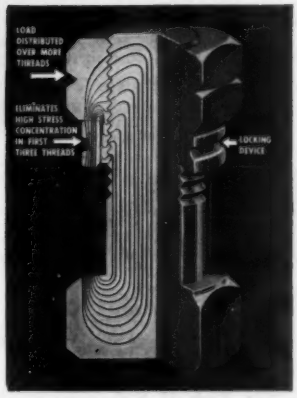
Tightening Threaded Fasteners (Torque) 24
Design and Application of Retaining Rings 30
Computer Assembly Techniques 37
Boosting Seam Welding Efficiency 42

JUNE

Designing a Spring Clip Retainer 22
Tightening Threaded Fasteners (Tools) 27
Spot Automation Speeds Appliance Assembly 36
Wire Inserts Ease Transmission Servicing 41
New Fastening Method By-Passes Deep Drawing 44
Radar Cable Assembly 49



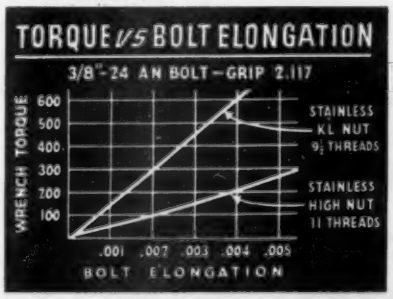
. . . take advantage of
ALL the STRENGTH
designed in your bolt!



. . . has no equal where
TENSILE STRENGTH, VIBRATION, CORROSION, HIGH TEMPERATURE ARE FACTORS!

On the severest of all jet engines, race car and like applications, Klincher has been tested, proved and acclaimed for these outstanding advantages:

- Can be re-used many times!
- Saves time, labor installing, removing!
- Only one piece to stock and handle!
- Ideal for standard and power wrenches!
- Manufactured in various materials!



Inquiries are invited regarding special locknut problems involving shank nuts, weld nuts, channel nuts and others. Write for data and samples, giving size and application. Address Dept. D-1.

Write for data and experimental samples, giving size and application. Address Dept. AF-1.

Klincher LOCKNUT CORPORATION
2153 Hillside Ave.
Indianapolis, Indiana

Use postpaid card. Circle No. 254

CONTENTS IN THIS ISSUE

Don't overlook these articles

FEATURES

22—How Good Are the Self-Tapping Screws You Buy?
Here is a guide for incoming inspection of screws.

28—Design, Application of Weld Fasteners
First of two articles covers types of weld projections as well as some typical applications.

37—The Assembly of Electric Organs
Standardization of procedures for building up wire harnesses plays key role in organ assembly.

43—Dirt-Proof Joints for Food Carts
Welding, brazing, riveting, swaging all play important roles at McClintock.

49—Blind Rivets Permit One-Man Assembly
How pull-through and self-plugging rivets permit fastening operations from one-side of work.

IDEAS AND REPORTS

15—Display Board Speeds Parts Purchasing
Hancock invites quotations by displaying the fasteners it uses.

15—Automatic Soldering Quadruples Output
Magnet assembly production jumped from 500 to 2000 a day after automation.

16—Chance Vought Develops New O-Ring Seal
Hydraulic O-ring could eliminate the need for anti-extrusion devices at high temperatures.

19—Threaded Inserts Resist Vibration
Stainless steel wire inserts prolong life of Cooper-Weymouth slide feeders.

20—Efficient Printed Circuit Board Assembly
British TV manufacturer cuts costs through new methods of electronic assembly.

DISTRICT MANAGERS • Assembly and Fastener Engineering

EASTERN DIVISION

Dan E. Reardon, V.P. in charge
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528
Home Address: Box 1,
South Glastonbury, Conn.
Home Telephone: MEdford 3-7083

NEW ENGLAND

John Pickering Jr.
c/o Hitchcock Publishing Co.
Box No. 29, Andover, Mass.
Telephone: GReenleaf 5-0499

NEW YORK METROPOLITAN AREA, EASTERN PENNA., CENTRAL N. Y. STATE, N. J. MD., DELA., D. of C.

Ralph Payne
c/o Hitchcock Publishing Co.
55 West 42nd Street
New York 36, N.Y.
Telephone: LAckawanna 4-4528

CENTRAL DIVISION

NORTHEASTERN ILLINOIS, WESTERN MICHIGAN
Henry J. Smith, V.P. in charge
c/o Hitchcock Publishing Co.
Wheaton, Illinois
Telephone: MOntrose 5-1000

NORTHERN INDIANA and EASTERN MICHIGAN
William E. Jacobs
c/o Hitchcock Publishing Co.
10432 W. McNichols
Detroit 21, Michigan
Telephone: DIamond 1-9525

WESTERN NEW YORK STATE, WESTERN PENNSYLVANIA, NORTHEASTERN OHIO
Ralph E. Helfrick
1507 Edgefield Avenue
Cleveland 24, Ohio
Telephone: HIllcrest 2-0189

SOUTHERN ILLINOIS, UPPER PENINSULA MICHIGAN, MINNESOTA, MISSOURI, SOUTH DAKOTA and WISCONSIN
Robert M. Prymuski
c/o Hitchcock Publishing Co.
Wheaton, Illinois
Telephone: MOntrose 5-1000

OHIO, SOUTHERN INDIANA and KENTUCKY

James C. Stewart, V.P.
c/o Hitchcock Publishing Co.
Wheaton, Illinois
Telephone: MOntrose 5-1000

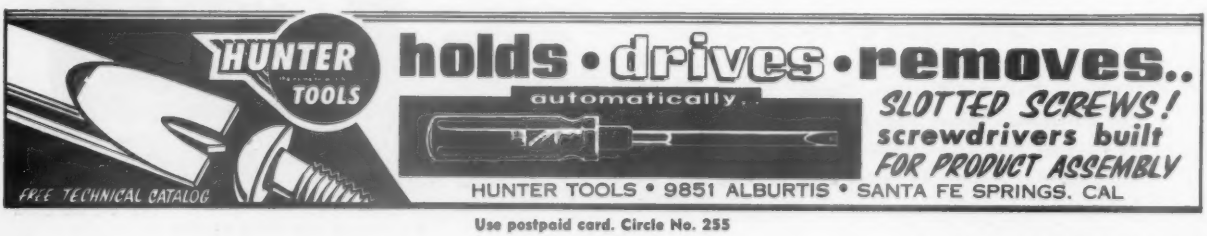
WESTERN DIVISION

CALIFORNIA, ARIZONA

Keith H. Evans
3723 Wilshire Boulevard
Los Angeles 5, California
Telephone: DUnkirk 8-2981
and
Room 225—515 Market St. Bldg.
San Francisco 5, California
Telephone: YUkon 2-4280

OREGON, WASHINGTON

Lloyd Thorpe
766 Dexter Horton Building
Seattle 4, Washington
Phone: MAin 2-4363



Use postpaid card. Circle No. 255

INDEX TO ADVERTISERS

A

AJAX MANUFACTURING COMPANY, THE 26
ALLEN MANUFACTURING COMPANY Third Cover
AMERICAN RIVET COMPANY, INC., THE 56
AMERICAN SCREW COMPANY 12, 16
AMERICAN SEALANTS COMPANY 63
ANCHOR FASTENERS, INC 58
AUTO-SWAGE PRODUCTS, INC. 56

B

BARTITE PRODUCTS CORPORATION (Sub. of L. J. Barwood Mfg. Co., Inc.) 8
BATCHELDER ENGINEERING COMPANY 55
BETHLEHEM STEEL COMPANY 9
BOOTS AIRCRAFT NUT CORPORATION 58
BRISTOL COMPANY, THE 46, 47

C

CAMLOC FASTENER CORPORATION 21

D

DETROIT BOLT & NUT COMPANY 64
DIXON AUTOMATIC TOOL COMPANY 20

E

EASTERN STATES SALES CORPORATION 59
ELASTIC STOP NUT CORPORATION OF AMERICA 14
ELCO TOOL & SCREW CORPORATION 66

F

FERRY CAP & SET SCREW COMPANY, THE 17

G

GRIES REPRODUCER CORPORATION 59
GRIP NUT COMPANY 55

H

HANDICRAFT TOOLS, INC. (Div. of X-Acto, Inc.) 68
HELI-COIL CORPORATION 34
HUBBELL INC., HARVEY 62
HUNTER TOOLS COMPANY 70

I

INDUSTRIAL RETAINING RING COMPANY 54

J

JOLIET WROUGHT WASHER COMPANY 2

K

KEYSTONE BOLT & NUT CORPORATION 60
KEYSTONE STEEL & WIRE COMPANY 35
KLINCHER LOCK NUT COMPANY 69

L

LAMSON & SESSIONS COMPANY, THE 4
LOCK-THREAD CORPORATION 68
LONG-LOK CORPORATION 67

M

MOLLY CORPORATION 64

O

OHIO NUT & BOLT COMPANY 32, 33

P

PHEOLL MANUFACTURING COMPANY Second Cover
PROGRESSIVE MANUFACTURING COMPANY, THE (Torrington Company) 52

R

REPUBLIC STEEL CORPORATION 58
ROCKFORD SCREW PRODUCTS COMPANY 40 A-F
ROSAN INC. 3

S

SCREW RESEARCH ASSOCIATION 36
SEGAL, EDWARD 60
SIMMONS FASTENER CORPORATION 48
SNAP-ON TOOLS CORPORATION 13
SOUTHCO DIVISION (South Chester Corporation) 6
SOUTHERN SCREW COMPANY Fourth Cover
SPERRY PRODUCTS INC. 60
STANDARD PRESSED STEEL COMPANY 42
SWEENEY MANUFACTURING COMPANY, B. K. 52

T

THOMPSON-BREMER & COMPANY (Division of AMF) 64
TORRINGTON COMPANY, THE (The Progressive Manufacturing Company) 52

V

VLIER ENGINEERING CORPORATION 18

W

WALDES KOHINOOR, INC. 10
WEDGELOCK CORPORATION 56

ONE LAST WORD

KNOWLEDGE AND THE INEVITABILITY OF SPECIALIZED RESPONSIBILITY

In olden days the blacksmith was the Compleat Metalworker. Whether you wanted a suit of armor, a kitchen knife, ornamental iron for the castle or a horseshoe, the smithy was your man. He represented, in metalworking, generalization in its most primitive form even though, in contrast to a tailor, the smithy may have thought of himself as a specialist.

With limited knowledge, broad generalization is possible; increase knowledge and specialization is the inevitable result. We may not like the attending complexities and problems this raises, but as a result of such knowledge and its attending specialization we whizz through the air, plow under the water, and live longer.

We don't have to go back hundreds of years to be conscious of the galloping technical knowledge which has changed our thinking and which has influenced our professional work. Let's go back only as far as the thirties.

I remember my apprentice days and the works manager who ran everything and knew everything. Nothing escaped his eagle eye. He always wore a hat, his vest had buttons missing and his pants were never pressed, but he knew his production and ruled his 2000-odd employees with a just but iron hand. He supervised, bought equipment, kept the peace, improved methods and didn't mind dirtying his hands when the occasion demanded. And there was a simple orderliness about it all. Truly, in his way, a field general, one of thousands throughout the country in the year 1933.

Then came the war, the forties and the fifties, and increased technical knowledge. And the engineers. And the specialists. And labor. Change, with money and prosperity pumped into its anemic body, became a whirling dervish. The old field general has long gone into a Happy Hunting Ground for Works Managers and in his place is a corps of plant managers, superintendents, and supervisors; behind them stands a solid phalanx of methods, process, industrial planning, design and production engineers, and specialists in controls, instruments, electronics, etc.

Volume of production since the 40's, murderous competition, rising complexities in manufacturing, new processes, labor's raucous voice, add to this the incessant call for lower costs and speedier production, and ever more and more knowledge, and it's not difficult to appreciate the inevitability of specialization. Today, one man may supervise, but not one man knows it all!

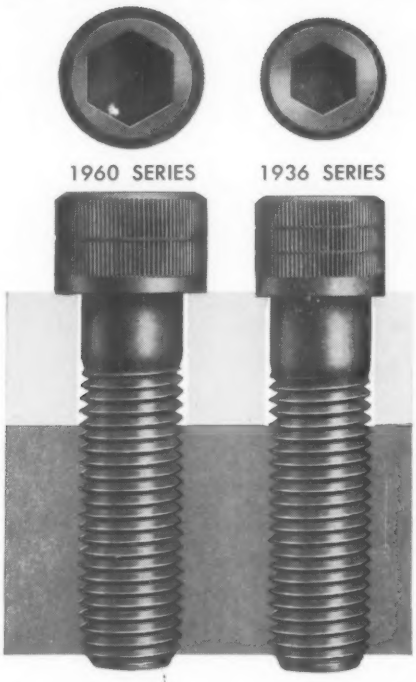
This increase in knowledge has fathered another interesting by-product: specialized responsibility. This is the same as saying, primary duty, or major emphasis. The heaviest concentration of readers of this magazine is among those who have chosen one phase of manufacturing or engineering or design as either more interesting or more vital in their operation than another. The knowledge of fastening, joining and assembling products has leaped forward since World War II. Bonding and adhesives, certain forms of welding, and automated and integrated assembly machines, to name but a few are either new or have leaped forward under the impetus of increased technical know-how. Many of the special fasteners, now standard products, were unknown before the forties. With this continuing knowledge it is not surprising that many engineers have embraced assembling and fastening as their primary responsibility. In today's complex industrial world, galloping forward at fantastic speeds, the engineer who knows all the answers, and is constantly abreast of every new manufacturing engineering or design development, exists only in the dream world of those who will not realize the specialized nature of our industrial civilization.

We may not like the theory of specialized responsibility any more than we like change; however, things are as they are and the ultimate in wisdom is to see things as they are. One cannot fight against knowledge, change, and specialization. The dinosaurs resisted change, but we don't think they quite got away with it.

Wm. J. Schleicher

Vice President & Editorial Director

Allen's *New '60 Series* Socket Head Cap Screws



give up to 2⅓ times more load carrying capacity ...without indentation!

In Allen's new '60 Series, head diameter of sizes from ¼" up is now uniformly one and one-half times the body diameter. In many sizes (where this ratio was not called for by 1936 Series specifications) this will provide *more* under-the-head bearing surface, and a proportionate *increase* in clamping force. Loads are more evenly distributed, and the greater bearing area in many cases eliminates need for washers.

Socket sizes have been increased in many cases—greater wrenching area permits higher tightening torque—which resists fatigue failure, and lengthens the life of the threaded joint.

- A new 2-band knurl will identify all ALLEN Cap Screws (except Stainless Steel) that conform to the new '60 Series specifications. New labels on boxes will also identify these.
- The 1936 Series of Allen Cap Screws will continue to be available.

COMPARISON OF ALLEN 1960 SERIES AND 1936 SERIES SOCKET HEAD CAP SCREWS

SCREW SIZE	HEAD DIAMETER Minimum (inches)		BEARING SURFACE Minimum (square inches)		PERCENT OF INCREASE IN BEARING SURFACE[1]	TENSILE LOAD TO INDENT IN SOFT STEEL[2] (lbs.)		TORQUE INDUCED TENSILE LOAD TO INDENT IN SOFT STEEL[2] (lbs.)	
	1960 Series	1936 Series	1960 Series	1936 Series		1960 Series	1936 Series	1960 Series	1936 Series
¼	.365	.367	.044	.044	—	4,750	4,750	2,780	2,780
5/16	.457	.429	.070	.052	33	7,440	5,600	4,380	3,300
3/8	.550	.553	.111	.111	—	12,100	12,100	7,000	7,000
7/16	.642	.615	.140	.103	36	15,000	11,000	8,850	6,450
½	.735	.739	.163	.183	—	19,500	19,500	11,500	11,500
9/16	.921	.863	.293	.216	35	31,000	23,200	18,500	13,600
¾	1.107	.987	.424	.224	89	45,000	24,000	26,700	14,100
7/8	1.293	1.111	.585	.253	131	62,500	27,000	36,800	15,900
1	1.479	1.297	.768	.405	89	82,000	43,500	48,500	25,500

[1]Head tolerance revisions on Sizes #0 thru #10, ¼, 5/16, and ½ diameter have no significant effect on bearing surface or holding power of screws.

[2]Values based on .00025 inch indentation.

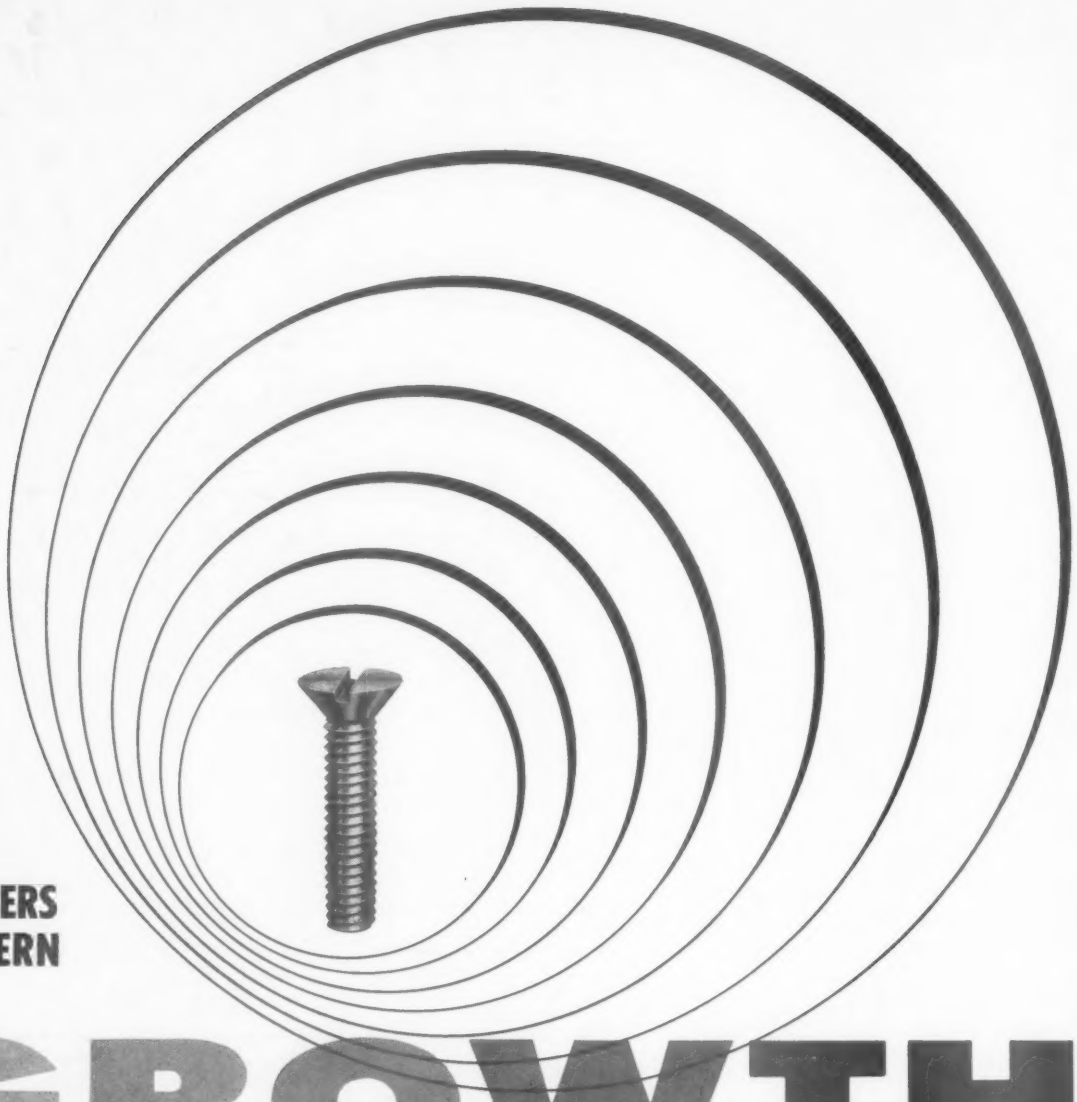
Ask your Industrial Distributor about ALLEN '60 Series Cap Screws. Write for samples and complete specifications. Ask for Bulletin G-25.

ALLEN MANUFACTURING COMPANY
Hartford 1, Connecticut, U.S.A.

Stocked and sold by leading industrial distributors everywhere

ALLEN HEX-SOCKET SCREWS HEAD

Use postpaid card. Circle No. 202



IN FASTENERS SOUTHERN IS GROWTH

Someone has said that it is no longer possible for business to stand still, for those which are stationary are left behind by those who are "on the grow." Southern Screw Company's growth in a comparatively short time is due to its ability to make better products for growing customers. Southern is dedicated to making better fasteners, giving better service, providing better packaging—at prices that are fair and competitive. It is not strange that Southern Screw's growth has kept pace with those we serve.

If yours is a growth company, Southern Screw in all probability is having an important part in your progress. If we are not now growing with you, perhaps it would be mutually beneficial to become a part of each other's growth pattern.

Direct your inquiries for quotations and samples to:

Southern Screw Company, P.O. Box 1360, Statesville, North Carolina

Machine Screws & Nuts - Tapping Screws - Stove Bolts
Carriage Bolts - Wood Drive Screws - Wood Screws
Dowel Screws - Hanger Bolts

Manufacturing and Main Stock in Statesville, N.C.

Warehouses:
New York - Chicago - Dallas - Los Angeles

Use postpaid card. Circle No. 203